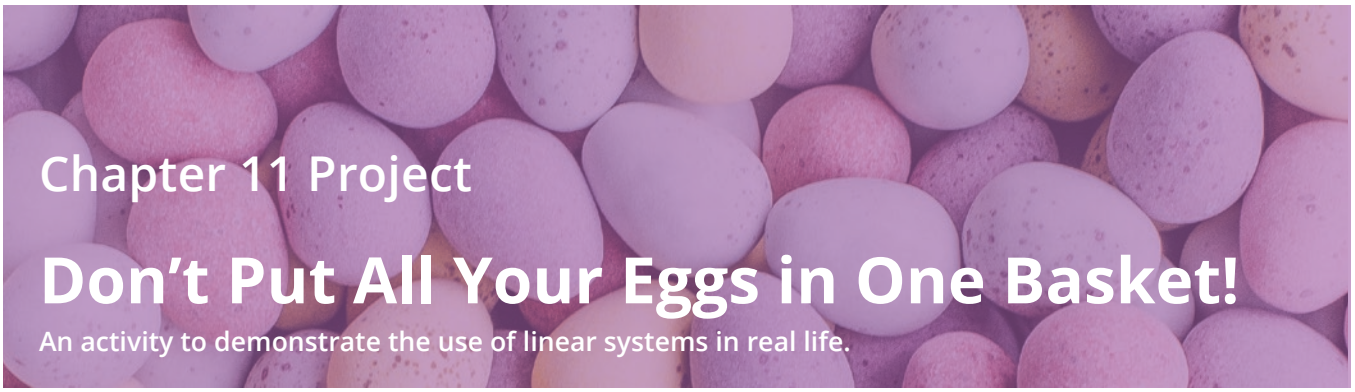

Chapter 11 Project

Don't Put All Your Eggs in One Basket!

An activity to demonstrate the use of linear systems in real life.

Have you ever heard the phrase "Don't put all your eggs in one basket"? This is a common saying that is often quoted in the investment world—and it's true. In an ever-changing economy it is important to diversify your investments. Splitting your money up into two or more funds may keep you from losing it all if one of the funds performs poorly. You may be thinking that you are too young to consider investments and saving money for retirement, but it is never too soon—especially in an economy where interest rates are extremely low. Low rates means it takes even longer to build up your nest egg. So start saving now and be sure to have more than one basket to put your eggs in! For this activity, if you need help understanding some of the investment terms, use the following website as a resource:
www.investopedia.com

Let's suppose that you received a total of $5000 in cash as a graduation present from your relatives. You also have an additional $2500 that you saved from your summer job. You are thinking about investing the $7500 in two investment funds that have been recommended to you. One is currently earning 4% interest annually (conservative fund) and the other is earning 8% annually (aggressive fund). Keep in mind that interest rates fluctuate as the economy changes and there are few guarantees on the amount you will actually earn from any investment. Also, note that higher rates of interest typically indicate a higher risk on your investment.

1. If you want to earn $400 total in interest on your investments this year, how much money would you have to invest in each fund? Let the variable x be the amount invested in Fund 1 and the variable y be the amount invested in Fund 2. Recall that to calculate the interest on an investment, use the formula $I = Prt$, where P is the principal or amount invested, r is the annual interest rate, and t is the amount of time invested, which for our problem will be 1 year ($t = 1$). Use the table below to help you organize the information. Note that interest rates have to be converted to decimals before using them in an equation.

	Principal	Interest Rate	Interest
Fund 1	x	0.04	$0.04x$
Fund 2	y	0.08	$0.08y$
Total	**a.**		**b.**

a. Fill in the total amount available for investment in the bottom row of the table.

b. Fill in the total amount of interest desired in the bottom row of the table.

c. What does $0.04x$ represent in the context of this problem? hours. You'll need to convert to make units consistent throughout.)

d. What does $0.08y$ represent in the context of this problem?

e. Using the principal column of the table, write an equation in standard form involving the variables x and y to represent the total amount available for investment.

f. Using the interest column of the table, write an equation in standard form involving the variables x and y to represent the total amount of interest desired.

g. Solve the linear system of two equations derived in parts e. and f. to determine the amount to invest in each fund to earn $400 in interest. (You may use any method you choose: substitution, addition/elimination, or graphing).

h. Check to make sure that your solution to the system is correct by substituting the values from part g. for x and y into both equations and verify that the equations are true statements.

2. Suppose you decide you want to earn more interest on your investment. You now want to earn $500 in interest next year instead of $400. sing a table similar to the one in Problem 1, organize the information and follow a similar format to determine the amounts to invest in each of the funds that will earn $500 in interest in a year. $x = \$2500, y = \$5000$

3. Compare the results you obtained from Problems 1 and 2. How did the amounts in each investment change when your desired interest increased by $100?

4. Suppose you decide that $500 is not enough interest and you want to earn an additional $100 on your investments for a total of $600 in interest. Using a table similar to the one in Problem 1, organize the information and follow a similar format to determine the amounts to invest in each of the funds that will earn $600 in interest in a year. $x = \$0, y = \$7500$

5. Compare the results from Problem 4 to the results from Problems 1 and 2.
   - **a.** How much are you investing in Fund 1 to earn $600 in interest?
   - **b.** How much are you investing in Fund 2 to earn $600 in interest?
   - **c.** How do your results contradict the advice provided to you at the start of this activity?
   - **d.** Is it possible to make more than $600 in interest on your $7500 investment using these two funds? Explain why or why not?
   - **e.** What is the smallest amount of interest you can earn on your investment using these two funds? How did you determine this?

6. How much interest would you earn if you split the initial principal of $7500 equally between the two funds? $450

7. If you actually had $7500 to invest in these two funds earning 4% and 8% respectively, how would you invest the money? Explain your reasoning. Answers will vary.

Chapter 11 Project: Don't Put All Your Eggs in One Basket!

1. **a.** 7500
   b. 400
   c. The interest earned on the amount invested in Fund 1 after 1 year
   d. The interest earned on the amount invested in Fund 2 after 1 year
   e. $x + y = 7500$
   f. $0.04x + 0.08y = 400$
   g. $x = \$5000, y = \$2500$
3. The amount invested in Fund 1 was cut in half and the amount invested in Fund 2 was doubled.
5. **a.** $0 or no principal
   b. $7500 or all of the principal
   c. The advice was not to put all your eggs in one basket or to not invest all your money in one type of investment.
   d. No, it isn't possible to earn more than $600 in interest with these two funds since investing the entire principal into Fund 2 gives you $600 in interest.
   e. $300 by investing the entire principal into Fund 1.