Name: Date:

Chapter 7 Project

Let the Games Begin!

It's time for a county fair! The fair committee is always looking for new booths to showcase. You've decided to enter a booth that will raise funds for a local nonprofit organization. Your job is to design a booth game that will draw in crowds of players but in the end will make money for your nonprofit. Be as creative as you can with your game. Don't forget to come up with a great title and an eye-catching design. The only requirement is that you must create a probability model for your game.

As you think about designing your game, keep the following in mind.

- Keep the rules easy. No one wants to take a long time learning how to play the game. You should be able to explain your game in 30 seconds.
- Familiar is better. Standard game items are around for a reason; try to use them.
- Stress winning, not losing. Imagine what would attract your attention. Let people know how they can win.
- Keep it simple. In order for you to forecast a profit for your booth, you will need your game to be simple enough for you to calculate an expected value model.
- Are all probabilities created equal? What kind of probability will each outcome have?

Step 1: Describe your game. What are the rules? What will you need to play the game (dice, spinner, cards, apps, etc.)? Be as detailed as you can on how to play the game. There is no need to decide how much it will cost to play until Step 5.

Step 2: In a table, list the possible outcomes, in dollar amounts, for your game. For example, in a game of *Spin the Wheel*, if you spin a 3 on the wheel, you win $2.00, but if you spin a 5 on the wheel, you win 20¢. You don't win anything for the other numbers. The figure below illustrates this.

Spin the Wheel

#'s on the Wheel	Winnings
1	-
2	-
3	$2.00
4	-
5	$0.20

Step 3: Add two extra columns to your table. In the first new column list the probability of each outcome, and in the second new column calculate the expected value for each.

Step 4: Calculate the expected prize money payout of your game. Based on your table, how much can you expect to pay out in prize money per turn?

Step 5: Now that you know your expected payout per turn, decide what it will cost a player to play one turn of your game at the fair. For example, in our Spin the Wheel game it costs a player $1.00 for a spin on the wheel.

Step 6: Using your table and your cost in Step 5, calculate the expected profit for your game.

Step 7: Assemble your game so that others can play it. Create a sign to advertise your game so as many people as possible will want to play.

Step 8: Test your game out. Have people play your game at least 25 times and record the outcomes in a table. Since this is just a trial run, no money needs to change hands. Just keep track of the payouts you would need to make if the game were actually played for money. How much total money did you bring in? How much money did you payout?

Step 9: Compare reality with your expected value.

Use your expected payout amount per play to determine how much money you would have expected to payout for 25 plays of the game.

Use your expected profit to determine how much profit you would have expected with 25 plays of the game.

How does your expected profit compare with your actual profit in Step 8?

Step 10: Reflection

What do you think the expected profit would be if the game were played 250 times? What if it were played 2500 times?

What do you think the actual profit would be if the game were played 250 times? What if it were played 2500 times?

Was the price to play suitable for making money on your game? Why or why not?

Explain how you could alter the game to make more money for your nonprofit organization. Do you think this would be as appealing to customers as your original game? Why or why not?

