Name _____ Date _____

Chapter 10 Performance Task (continued)

Fair and Unfair Carnival Games

How can someone use theoretical probability to his or her advantage?

You and some friends are in charge of setting up a carnival booth at a fundraiser. Together your team designs and creates a "Rock, Papers, Scissors" board. Inside each envelope is the word "Rock," "Paper," or "Scissors." Each word is used exactly 8 times.

For $1, a student comes up and shows "Rock," "Paper," or "Scissors." Then he or she opens an envelope randomly. If the student beats the envelope, he or she keeps the dollar. If the student loses, the dollar is donated.

1. How much money should your team expect to raise if 100 students play and they all show "Paper?"

2. Is the probability in Exercise 1 theoretical or experimental? Explain your reasoning.

3. If you knew that most students show "Rock," how could you design the board so that the carnival makes money $\frac{7}{8}$ of the time? 50% of the time?

Name_____ Date _____

Chapter 10

Performance Task (continued)

Fair and Unfair Carnival Games

4. One player asks you what happens if they "tie" with the envelope – or if he or she shows "Rock" and then chooses an envelope with "Rock." Your team decides that if this happens, the player gets to have a second chance to win using the "Rock" he or she showed. However, the player gets to choose whether he or she wants to keep all 24 squares open to choose from *or* eliminate the envelope he or she just opened. If the player decides to keep all 24 squares open, he or she needs to be aware that the directors of the game may rearrange the squares in the envelopes, especially the one which was just chosen. If the player happens to tie again, the player donates his or her dollar. Which would be a better choice for the player if he or she wants the dollar back? Which would be a better choice for your team if you want to raise more money? Justify your answers using probabilities.

5. Design an "unfair" carnival game using a spinner or a number cube. Calculate your classmates' theoretical probability of winning. Have a classmate play your game and record his or her experimental probability of winning.