Name_____

The Egg Roulette Game Student Handout

Part I:

Rules of Egg Roulette:

Reflecting on the videos

1. Do you think each player has the same probability of winning the game when guest of the show goes first? Explain.

2. Is the probability of winning similar to flipping a coin? Why/Why not?

3. Are the events of selecting eggs conditional or independent events? Demonstrate your reasoning.

With your partner play the egg roulette game 5 times marking yes or no and tally the number of wins for each player in the table below. Guest of the show must take the first turn in all 5 games!

	Player 1: (Guest)	Player 2: (Fallon)
Game 1		
Game 2		
Game 3		
Game 4		
Game 5		
Total # of Wins		

5. Using the class totals, what is the empirical probability Fallon wins the game? Does this give him an advantage or disadvantage, why?

6. Using the combined data, estimate the probability Fallon wins the game.

7. **The Law of Large Numbers** means: *"As the number of experiments increases, the actual ratio of outcomes will converge on the theoretical, or expected, ratio of outcomes."* What does this mean and how does it apply to this situation?

Part II:

8. Open the computer applet located at http://www.rossmanchance.com/ISIapplets.html. Select 'Categorical Response/One Proportion'. Enter 0.55 for 'probability of heads'. Note that this heading will change to 'probability of success' once the numeric value changes from 0.5 to 0.55. Enter 24 for 'sample size', and number of samples to 100.

Describe the shape and variability of the sampling distribution of a sample proportion after 100 samples.

9. What changes do you notice in the graph as the number of samples increases to 1000?

10. What proportion of wins or losses for Fallon would surprise you? If we consider an unusual or surprising event to occur less than 5% of the time, what proportion of wins and losses fall in this range?

11. How can we determine if our class results are unusual? Enter the sample proportion of the class generated data in the 'count as extreme as box'. By using the empirical sampling distribution, we can estimate the likelihood of obtaining our class results or something more extreme. Interpret the results.

12. Explain the **Central Limit Theorem** (*look this up)* and how this relates to the theoretical probability that Fallon has of winning the game.

13. Can you describe how the Law of Large Numbers or Central Limit Theorem might be applied to a larger context, or real world example?