Name: _____ Hour: _____ Date: _____

Lesson 5.1: Day 2: Are Soda Contests True?

Pepsi ran a promo contest for their 20 oz. bottles of soda. Some of the caps said, "Please try again!" while others said, "You're a winner!" Pepsi advertised the promotion with the slogan "1 in 6 wins a prize." Mrs. Gallas' statistics class wonders if the company's claim is true. To find out, all 30 students in the class go to the store, and each buys one 20-ounce bottle of the soda. **Two of the 30 students** get caps that say "You're a winner!"

1. How many winners would you expect to get out of a class of 30? Is it guaranteed?

Does this result give convincing evidence that the company's 1-in-6 claim is inaccurate? We will perform a **simulation** to help answer this question. We will **assume Pepsi is telling the truth**. If they are telling the truth, what is the probability of getting 2 or fewer winners in a class of 30 **purely by chance?** Let's find out.

2. What could we use to model a 1/6 probability? _____ Assign certain outcomes to "Losers" and "Winners". List them below.

3. Roll your die 30 times to imitate the process of the students in Mrs. Gallas' statistics class buying their sodas. How many of them won a prize? _____

4. Repeat steps 1 and 2. How many won a prize this time? _____

5. Plot the number of prize winners for each trial of 30 to the dot plot on the board. (2 dots)

6. Sketch the class dot plot below.

7. What percent of the time did Mrs. Gallas' statistics class get two or fewer prizes, just by chance?

8. Does it seem plausible that the company is telling the truth but that the class just got unlucky? Or in other words, do we have **convincing evidence** that Pepsi is lying?

Lesson 5.1 Day 2– Simulation

Important ideas:

Check Your Understanding

A basketball announcer suggests that a certain player is a streaky shooter. That is, the announcer believes that if the player makes a shot, the player is more likely to make the next shot. As evidence, the announcer points to a recent game where the player took 30 shots and had a streak of 10 made shots in a row. Is this convincing evidence of streaky shooting by the player? Assume that this player makes 50% of the shots and that the results of a shot don't depend on previous shots.

1. Describe how you would carry out a simulation to estimate the probability that a 50% shooter who takes 30 shots in a game would have a streak of 10 or more made shots.

The dotplot displays the results of 50 simulated games in which this player took 30 shots.

Longest streak in simulated game
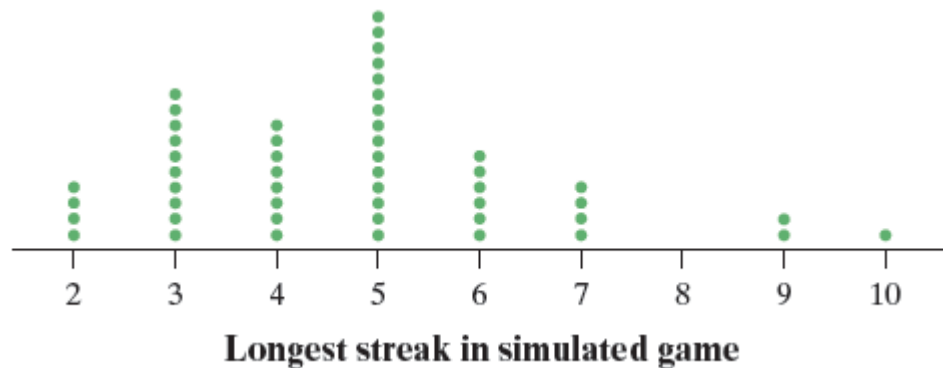
2. Explain what the two dots above 9 indicate.

3. What conclusion would you draw about whether this player was streaky? Explain your answer.