Spinning Probabilities

The goal of this activity is to explore a simple chance situation.

Two fair spinners are part of a carnival game. The first spinner contains the colors white, red, yellow, and blue. The second spinner contains the colors white and green. A player wins a prize only when both arrows land on colors other than white after each spinner has been spun once.

1. Does the outcome of the spin on one spinner impact the outcome on the other spinner?

Two events \( E \) and \( F \) are **independent events** if the occurrence of \( E \) in a probability experiment does not affect the probability of event \( F \). Two events are **dependent** if the occurrence or event \( E \) in a probability experiment affects the probability of event \( F \).

2. Let \( W \) represent the outcome of the arrow landing within the white region. Similarly, let \( R, Y, B, \) and \( G \) represent the outcome of the arrow landing within the red, yellow, blue, and green regions, respectively. Describe the sample space of the carnival game.

3. Based on the sample space, what is the probability of winning a prize?
4. What is the total number of favorable outcomes on the first spinner? What is the total number of favorable outcomes on the second spinner? Based on the sample space, how many total favorable outcomes are there when both spinners are spun?

5. What is the total number of outcomes on the first spinner? What is the total number of outcomes on the second spinner? Based on the sample space, how many total outcomes are there when both spinners are spun?

6. What is the probability of favorable outcomes on the first spinner? What is the probability of favorable outcomes on the second spinner? Based on the sample space, what is the probability of winning the carnival game?

7. Determine a rule for calculating the probability of winning the carnival game based on the probabilities of the favorable outcomes of the individual spinners.

8. Look up the Multiplication Rule for Independent Events in the book. Does it agree with your answer to item 7?