Is It Fair?

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

Two fair spinners are part of a carnival game. A player wins a prize only when both arrows land in the shaded areas after each spinner has been spun once. Zach is playing the game.

1. Zach thinks that he has a 50-50 chance of winning. Do you agree or disagree with Zach? Explain.

2. If you played the game 10 times, how many times would you expect to win? _________

3. Make a spinner arrow by bending the outside edge of a paper clip back so that it points in the opposite direction, as shown. (The length of your spinner arrow should be equal to the radius of the spinner disk, or $\frac{7}{8}$ inches.)

4. Working in your group, use the actual spinners to gather data on 10 games. Record your results in any way that you wish.

5. Based on your results from number 4,
   a. If you played the game another 10 times, how many times would you expect to win? _________
   b. Is this prediction the same as your first prediction for 10 games in number 2? Why, or why not?

6. On the next page, use the frequency graph labeled “10 Games” to display the data that you gathered in number 4.

7. Use technology (e.g., graphing calculator or computer spreadsheet) to gather data on 20 games. Graph your results on the frequency graph labeled “20 Games.”

8. Repeat the process for 50 games and 100 games, completing the appropriate frequency graph in each case.

Source: *Navigating through Probability in Grades 9–12*, NCTM
9. What observations, if any, can you make about these graphs?

10. Now that you have explored the spinner game a little more thoroughly, what do you think is the chance that both spinners will land in the shaded areas in this game? _________

11. Provide a convincing explanation that a high school student could follow for the value you game in number 10.
Empirical Probability

Spinners for “Is It Fair?”

Source: *Navigating through Probability in Grades 9–12*, NCTM