

Exploring Probability Through Rock – Paper – Scissors

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To help my students consider compound probability of independent events, I use the familiar game of rock-scissors-paper. Working in pairs, each partner uses the traditional gesture to indicate either rock (clenched fist) or paper (palm down) or scissors (2 fingers extended). Winning permutations (player1, player2) player 1 are: (rock, scissors), (paper, rock) and (scissors, paper), because rock shatters scissors, paper wraps rock, and scissors cut paper. Winning combinations for player 2 are: (rock, paper), (scissors, rock), and (paper, scissors). The table below shows all the permutations:

Player 1	Player 2	Player 1 Outcome	Player 2 Outcome
Rock	Rock	Tie	Tie
	Scissors	Win	Lose
	Paper	Lose	Win
Scissors	Rock	Lose	Win
	Scissors	Tie	Tie
	Paper	Win	Lose
Paper	Rock	Win	Lose
	Scissors	Lose	Win
	Paper	Tie	Tie

1. Partners number a piece of paper 1-30
2. Each partner needs a different colored pen/pencil/marker
3. Play Rock – Paper – Scissors thirty times
4. Each time a player wins, the player records the win and the winning move (rock, paper, scissors).

After all thirty games are played:

1. Total each of the results (# of each player's wins with rock, paper, scissors).
2. What fraction of the games did you win?
What fraction of the games did your opponent win?
What fraction of the games were a tie?
3. What percent of the games were won with rock? Paper? Scissors?
Make a hypothesis about what this means.
4. What percent of the games were a tie?
Make a hypothesis about what this means.

5. If you and your partner repeated this experiment one thousand times, what would you expect to happen?

After partners have analyzed their data:

1. Tally the data for the entire class (percent wins with rock, percent wins with paper, percent wins with scissors, percent ties).
2. Does the data for the whole class support or refute your earlier hypotheses?

Use TinkerPlots to build a model to simulate what happened in class. What assumptions are you making?

One important assumption is that the probability of selecting rock, scissors, or paper is the same for each player and that it is $\frac{1}{3}$. What might happen if one player chose rock about $\frac{1}{2}$ the time and the other two options each about $\frac{1}{4}$ of the time?