3/9

Dependent Events

One event affects the other

Draw a card out a deck, then another without replacing the first card.

Independent Events

One event doesn't affect the other

Draw a card, replace it, then draw another card.

Identify the situations below as either dependent or independent events.

a. Flipping a "heads" on a quarter *and* then flipping another "heads."

Independent

b. Choosing a jack from a standard deck of cards, not putting it back in the deck, *and* then choosing a king.

Dependant

c. Picking a blue marble from a bag of marbles, putting it back, *and* then picking a blue marble again.

Independent :)

d. Rolling a 6 on a number cube three times in a row.

Independent

ROCK-PAPER-SCISSORS

Read the rules for the rock-paper-scissors game below. Is this a fair game? Discuss this question with your team.

How to Play

- At the same time as your partner, shake your fist three times and then display either a closed fist for "rock," a flat hand for "paper," or a partly closed fist with two extended fingers for "scissors."
- Rock beats scissors (because rock blunts scissors), scissors beats paper (because scissors cut paper), and paper beats rock (because paper can wrap up a rock). If you both show the same symbol, repeat the round.

a. While both players are making their choice at the same time, this game has *two events* in every turn. What are the two events? Player 1's choice or play and Player 2's choice or play.

b. If you and a partner are playing this game and you both "go" at the same time, does your choice affect your partner's choice? Explain.
No, each person doesn't know what the other is going to do.

c. Are the two events in this game **dependent** (where the outcome of one event affects the outcome of the other event) or **independent** (where the outcome of one event does *not* affect the outcome of the other event)? Explain your reasoning. Independent, the choices by each partner do not affect each other.

d. Work with your team to determine all of the possible outcomes of a game of rock-paper-scissors, played by two people (call them Person A and Person B). Be sure to include the word "and." For each outcome, indicate which player wins or if there is a tie. Be prepared to share your strategies for finding the outcomes with the class.

With Player A's choice first, then Player B's: R-and-R (tie), R-and-P (B wins), R-and-S (A wins), P-and-R (A wins), P-and-P (tie), P-and-S (B wins), S-and-R (B wins), S-and-P (A wins), S-and-S (tie)

5-45. Is rock-paper-scissors a fair game? How can you tell?

Yes, there is a $\frac{1}{3}$ probability for each outcome: Person A wins, Person B wins, or there is a tie.

Imagine that two people, Player A and Player B, were to play rock-paper-scissors 12 times.

a. How many times would you expect Player A to win? Player B to win?

4 times. 4 times

b. Now play rock-paper-scissors 12 times with a partner. Record how many times each player wins and how many times the game results in a tie.

c. How does the experimental probability for the 12 games that you played compare to the theoretical probability that each of you will win? Do you expect them to be the same or different? Why?

It is likely that the experimental results will not be exactly the same as the theoretical prediction.