Unit 8, Lesson 11

# Probabilities in Games

Let's use probability with games.

## 11.1 Rock, Paper, Scissors

There is a classic game called "Rock, Paper, Scissors." Two people play by counting to 3 together, then making a hand gesture to resemble paper (hand flat, palm down), rock (fist), or scissors (two fingers extended).

- When paper and rock are shown, paper wins the round.
- When paper and scissors are shown, scissors wins the round.
- When rock and scissors are shown, rock wins the round.
- When both players show the same thing, the round is a tie.

Find a partner, and play the game with that partner 10 times in a row. Record the number of times you have played the game, the name of your opponent, what each person shows in each round, and who is the winner. After playing 10 games, find a new partner, play the game 10 times with this new partner, and record the results. Continue until your teacher tells you to stop.

Is the event "win the round" dependent on another event? Explain your reasoning.

Choose an event that you think might influence the probability of winning, then analyze the data using probability to determine whether the event you chose to study is independent of winning. Provide evidence to support your claim.

# 11.2 Guess Which Card

Your teacher will give you 3 index cards.

- Leave one card blank.
- Use a ruler to draw lines connecting opposite corners to make an X on one side of the second card.
- Use a ruler to draw lines connecting opposite corners to make an X on both sides of the third card.
- Put all three cards in the bag.

One partner will remove a card from the bag and place it on the desk immediately so that only one side of the card can be seen. The goal is to guess correctly which card is on the desk: the blank card, the card with an X on only one side, or the card with an X on both sides.

1. Noah is playing the game and is looking at a card that shows an X. He says, "I have a fifty-fifty chance of correctly guessing which card it is." Do you agree with Noah? Explain your reasoning.

2. Play the game many times with your partner, taking turns for who takes a card out of the bag. Record whether the side that shows has an X or is blank, which card you guess, and which card it actually is when you check. Continue to play until your teacher tells you to move on.

3. Use the results from your games to estimate
   $P(\text{the card had an X on both sides} \mid \text{the side showing had an X on it})$. Explain or show your reasoning.

4. Because all of the outcomes are known, find the actual probability
   $P(\text{the card had an X on both sides} \mid \text{the side showing had an X on it})$. Explain or show your reasoning.