

Name \_\_\_\_\_

What are the **Odds**?

**W**hat does the word '**probability**' mean? Play the game to find out!

## Paper Scissors & Rock

### Get Started

- 1** With a partner, you will need
- two sets of hands
  - this Previsit Activity sheet
  - a pencil

### Let's Play!

**2** A rock is a closed fist. Paper is palm face down, and scissors is the number two horizontally. With your partner, both of you must simultaneously hit your other hand twice, and on the third time give the symbol you wish. Rock beats scissors. Paper beats rocks. Scissors beats paper. If you both give the same symbol then it's a tie.

In groups of two, play the 18 rounds of Paper, Scissors and Rock. Keep a record of your wins, losses and ties using the chart below.

**3**

	Win	Lose	Tie
Round # 1			
# 2			
# 3			
# 4			
# 5			
# 6			
# 7			
# 8			
# 9			
# 10			
# 11			
# 12			
# 13			
# 14			
# 15			
# 16			
# 17			
# 18			
<b>TOTAL</b>			

# of times I won

# of rounds

# of times I lost

# of rounds

# of times we tied

# of rounds

### The Score

**4** With 2 players, this game has **9** different outcomes. List them below.

Me	My partner	
1. <u>paper</u>	<u>rock</u>	<u>win</u>
2. _____	_____	_____
3. _____	_____	_____
4. _____	_____	_____
5. _____	_____	_____
6. _____	_____	_____
7. _____	_____	_____
8. _____	_____	_____
9. _____	_____	_____

**6** How many ways can you win?   
 How many ways can you lose?   
 How many ways can you tie?

**5** In the blanks above, label the 9 different outcomes as either a win, a loss, or a tie.

### What is Probability?

It's the chance of some event happening. Expressed as a fraction, you can calculate the probability that you will win in a round of Paper, Scissors and Rock for example.

$$\text{PROBABILITY OF A SPECIFIC EVENT OCCURRING} = \frac{\text{\# OF WAYS THE SPECIFIC EVENT CAN OCCUR}}{\text{TOTAL \# OF OUTCOMES POSSIBLE}}$$

**7** What is the probability I will win in any round? Using the probability formula above,

$$\text{Probability of me winning} = \frac{\text{\# of ways I can win}}{\text{total \# of outcomes possible}} = \frac{\text{[ ]}}{\text{[ ]}} = \text{[ ]}$$

How do these numbers compare to your actual wins, losses, and ties during the 18 rounds you played?

**8** What is the probability I will lose in any round? Using the probability formula above,

$$\text{Probability of me losing} = \frac{\text{\# of ways I can lose}}{\text{total \# of outcomes possible}} = \frac{\text{[ ]}}{\text{[ ]}} = \text{[ ]}$$

Are they almost equal to your actual wins and losses?

### The Result

**9** You are in a Paper, Scissors and Rock marathon, playing 300 rounds, to raise funds for a school charity. For every time you win, your partner gives you 10¢. For every time you lose, you give 10¢ to your partner. If it's a tie, you and your partner give 10¢ to the charity.

On average after 300 rounds:

You will spend \$  and win \$ .

Your partner will spend \$  and win \$ .

The charity will spend \$  and win \$ .



You know what probability means now.

(If not take a quick peek on the other side!) So it's time to take...

# The Probability Quiz



## Round #1: Warm-up

- 1 A deck of 52 cards is shuffled and the top 2 cards are put on a table, face down. You win \$1 if the second card is the queen of hearts. What is the probability of winning the dollar?  
a)  $1/52$       b)  $2/52$       c)  $1/51$       d)  $1/2$
- 2 You turn over the first card and it is the 7 of clubs. Now what is your chance of winning the dollar?  
a)  $1/52$       b)  $2/52$       c)  $1/51$       d)  $1/2$
- 3 There are two boxes.
  - Box A contains 3 red marbles and 2 blue marbles.
  - Box B contains 30 red marbles and 20 blue marbles.One marble is drawn at random from one of the boxes. If it is red, you win. Choosing between the two boxes, which box gives you a better chance of winning?  
a) Box A      b) Box B      c) It doesn't matter which box you choose.



**Probability is not psychic**

Probability only tells you how likely an event is over many trials; it doesn't predict exactly what will happen on any given trial.

Probability suggests that if you roll a die six times you'll see a 3 once—but that doesn't mean it will happen. You may see a 3 four, five or even six times, or not at all.

## Round #2: Psychic guess

- 4 The probability of rolling a 7 with two 6-sided dice is  $1/6$ . The probability of rolling a 2 with two 6-sided dice is  $1/36$ . If you roll two 6-sided dice, what number are you going to see?  
a) 7      b) 2      c) neither      d) I don't know
- 5 You see a fellow fly his kite into a thunderstorm and receive quite a shock when lightning strikes the kite and travels down the metal wire he uses in place of a string. You ask him what he is doing. He replies, "The probability of winning the Lotto 6/49 jackpot is 1 in 14,000,000. The probability of getting struck by lightning is 1 in 600,000. You are 23 times more likely to get struck by lightning than win the Lotto 6/49 jackpot." Continuing his explanation he says, "So, if I get hit by lightning 23 times, I'll be a shoo-in to win the lottery." This fellow's reasoning is  
a) correct. In fact, if you get hit by lightning 46 times you win the lottery twice.  
b) incorrect. Lotto 6/49 is a game of chance independent of all actions.  
c) flawed. Lightning and the Lotto 6/49 draws do not occur at the same rate. You have to get hit by lightning more than 23 times before you will win the lottery.

**Chance has no memory**

A die doesn't remember how it fell last time it was rolled. It doesn't matter if you haven't rolled a four in 10 tries or rolled a four 10 times in a row. The probability of a four on the next roll remains exactly the same.

## Round #3: Oops, amnesia

- 6 Your friend plays on the best basketball team in the city, and they are playing the worst basketball team in the city. It's safe to bet on the game  
a) all the money you can get your hands on.  
b) all the money you have since you will get it all back anyway.  
c) only the amount of money you'd be comfortable losing, nothing is a sure thing.

**Probability is an average of many trials**

The more times you try a particular action, though, the more likely it is that your results will fall close to what probability predicts. So if you throw a die 600 times, you'd expect to see about 100 fours, 100 threes, 100 sixes, and so on.

## Round #4: Sorry, try again

- 7 When you gamble at a casino, the odds are carefully calculated to be  
a) stacked in your favor.  
b) stacked against you.  
c) it depends how many people you are playing.  
d) if it is a fair game you have equal chances of winning and losing.
- 8 You are reading the National Post-It newspaper. They have a non-scientific survey that states 9 out of 10 residents in Canada prefer granola to candy. This means  
a) if you were to randomly ask 10 Canadians, 9 of them would prefer granola.  
b) the majority of Canadians prefer granola.  
c) nothing, for all you know this survey is based on 10 guinea pigs that are pets of the editor.



- 9 The safest way to increase your savings is to  
a) deposit it into a guaranteed investment.  
b) bury it in the backyard.  
c) use probability and make bets.

▶ How many did you get right?

Don't think you did too well on this session of "The Probability Quiz"? Have no fear! Watch out for...

# The Probability Quiz?



on a Postvisit Activity sheet near you!