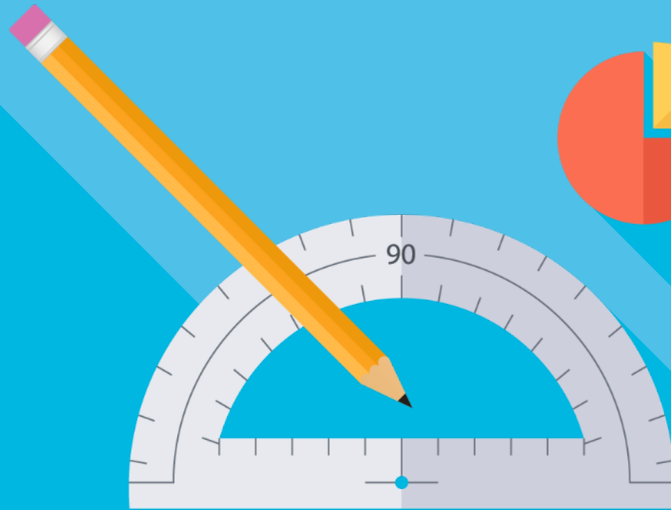


Friday

Term 4 Week 3



Chance

WALT:

- Compare observed frequencies across experiments with expected frequencies

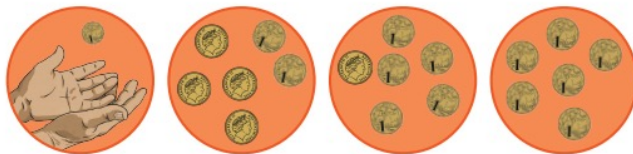
Expected vs Observed Frequencies

What do you expect the chance of flipping a heads or tails on a coin is?

Half, 50% $1/2$, 0.5



If you were to try it out, what could happen?



Chance is not always predictable! There is often a difference between the frequency we **expect** and the frequency we **observe**.

If we were to flip the coin 100 or 1000 times, this difference would become less and less.

Let's revise the vocabulary

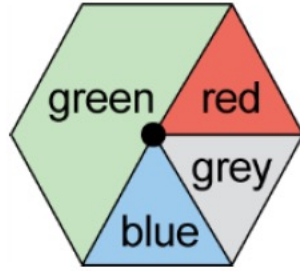
We can describe the *chance of something happening* using either words or numbers.

<i>Words:</i>	impossible	unlikely	(fifty-fifty) even chance	likely	certain
<i>Numbers:</i>	0% or 0	between 0 and $\frac{1}{2}$	50%, $\frac{1}{2}$ or 0.5	between $\frac{1}{2}$ and 1	100% or 1

Frequency vs Probability

Frequency is a measure of how often an event occurs on average during a unit of time (how many times an engine supposed to start every morning fails to start per year). ... Probability is by definition **a number between nil and one**, measuring the chances some event may or may not happen.

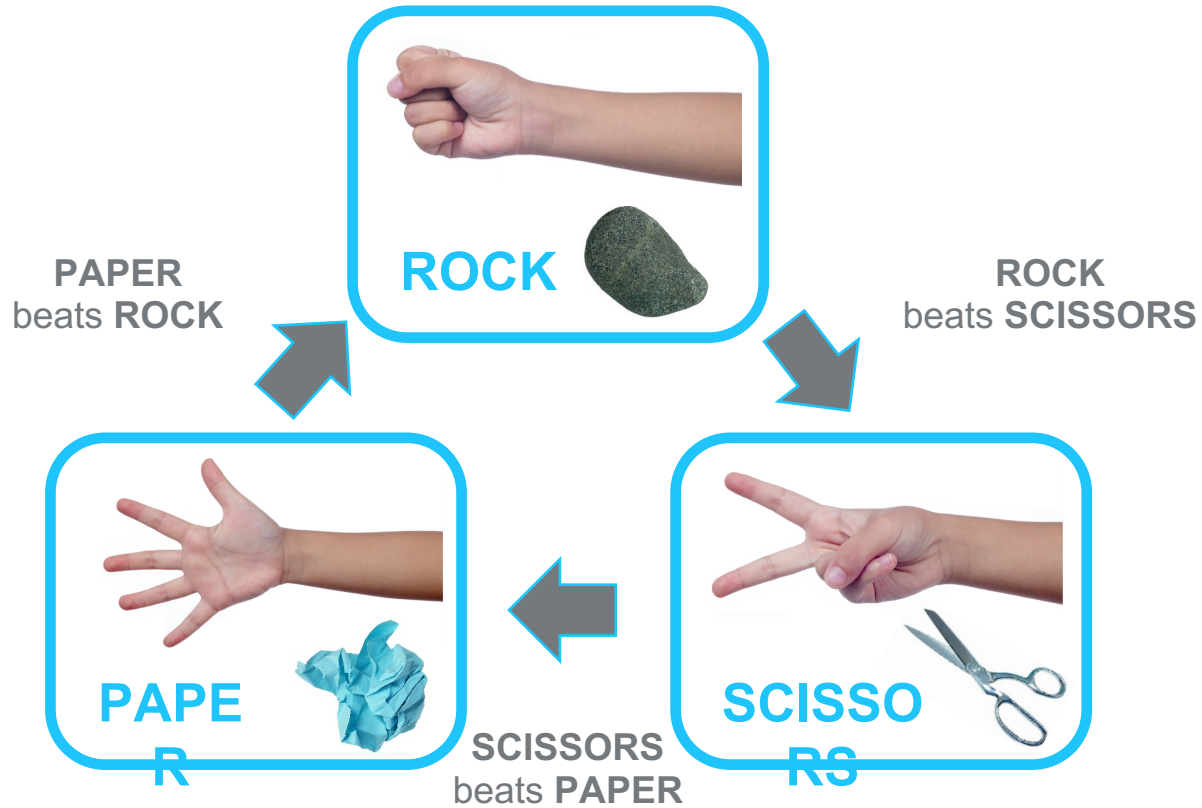
Fairness of frequency



Is the frequency of this chance experiment equal? Why/ why not?

How could this be deemed 'fair'?

Observed vs expected frequencies



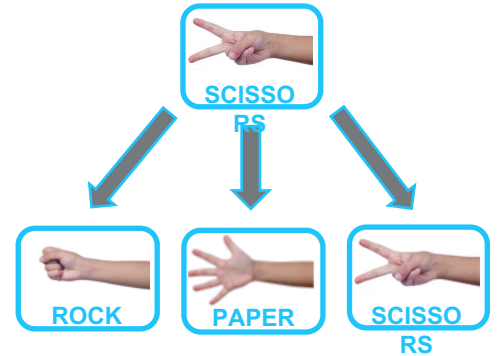
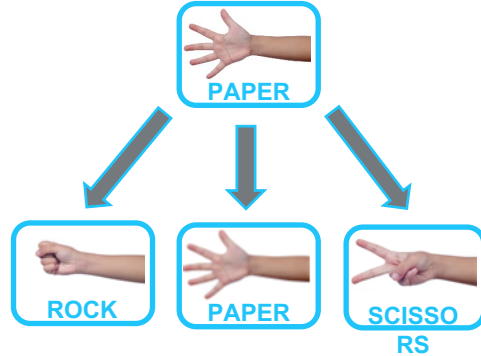
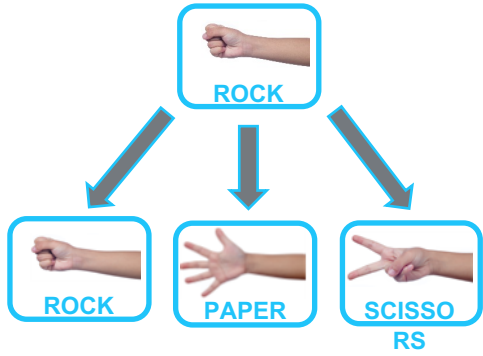
What is the chance of winning?

PLAYER 1



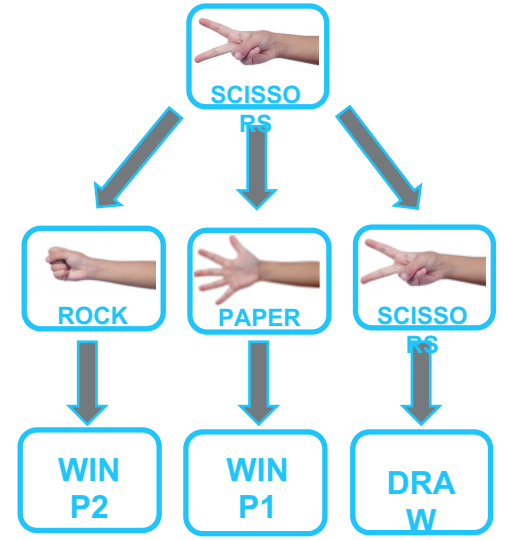
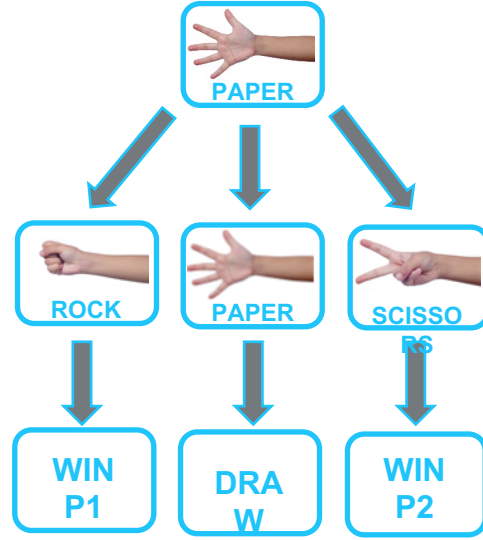
PLAYER 1

PLAYER 2



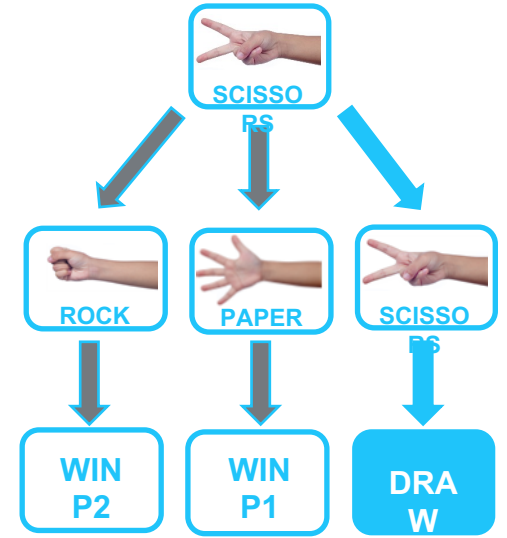
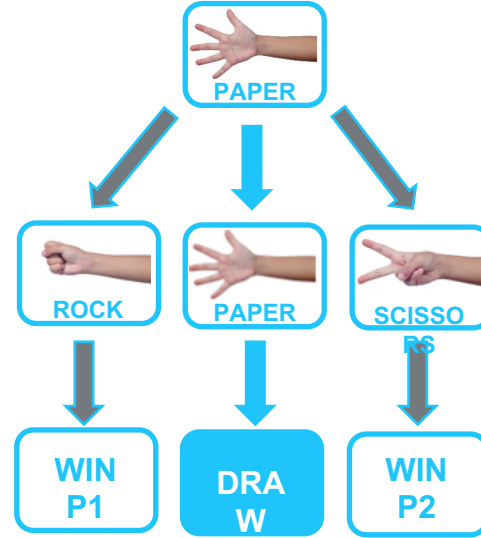
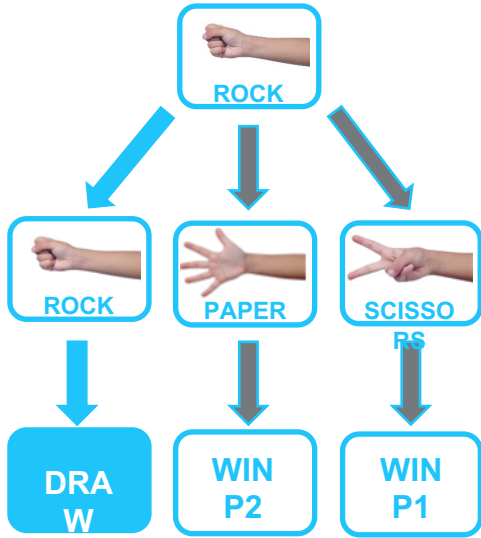
PLAYER 1

PLAYER 2



PLAYER 1

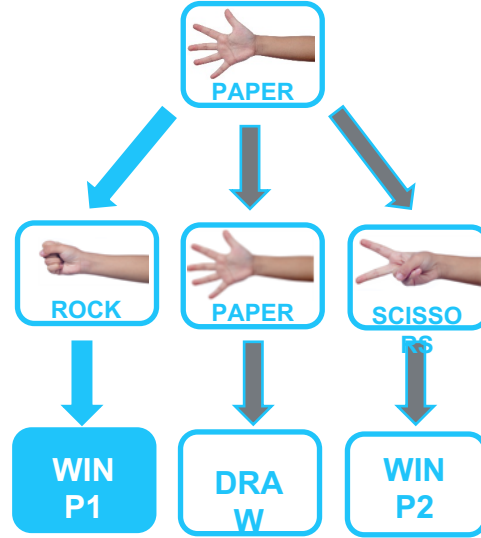
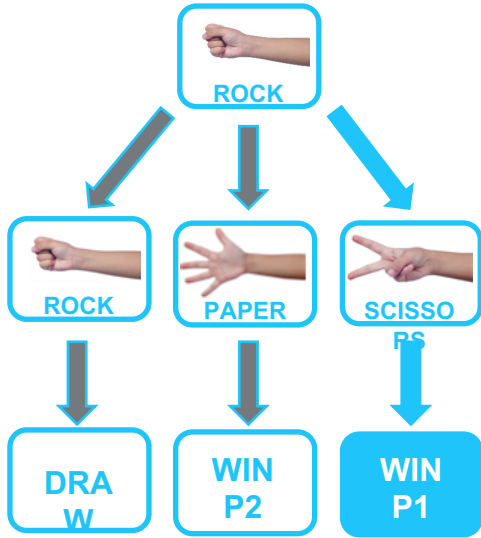
PLAYER 2



DRAW
3 in 9 or $\frac{1}{3}$

PLAYER 1

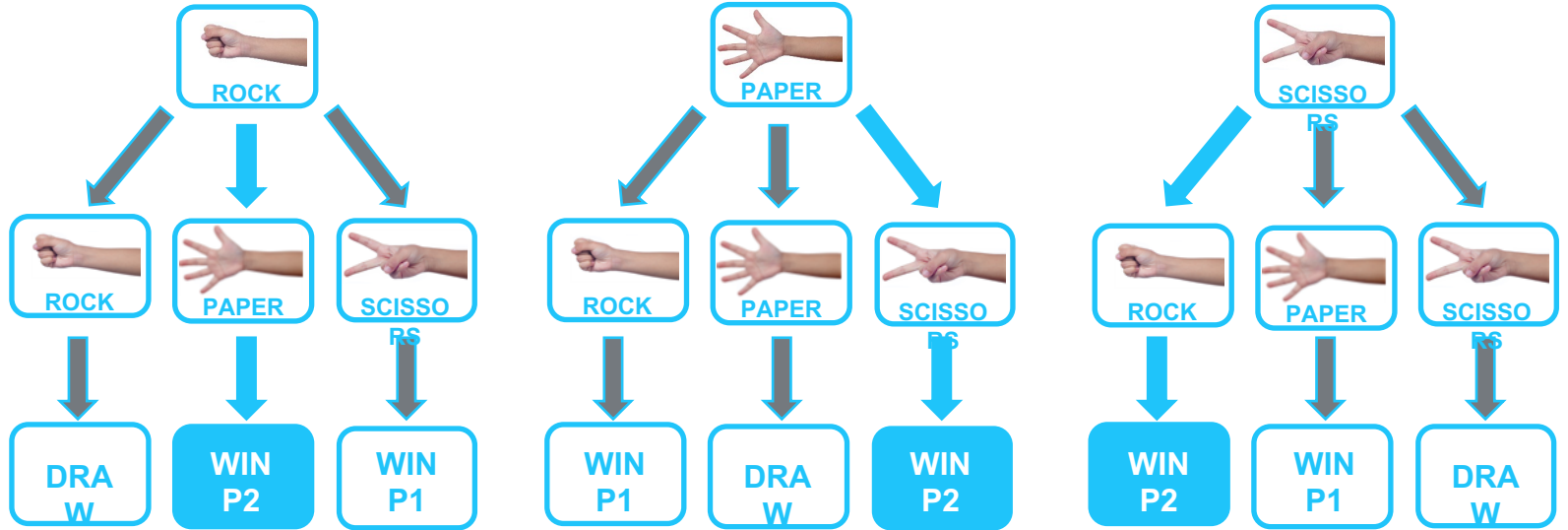
PLAYER 2



WIN P1
3 in 9 or $\frac{1}{3}$

PLAYER 1

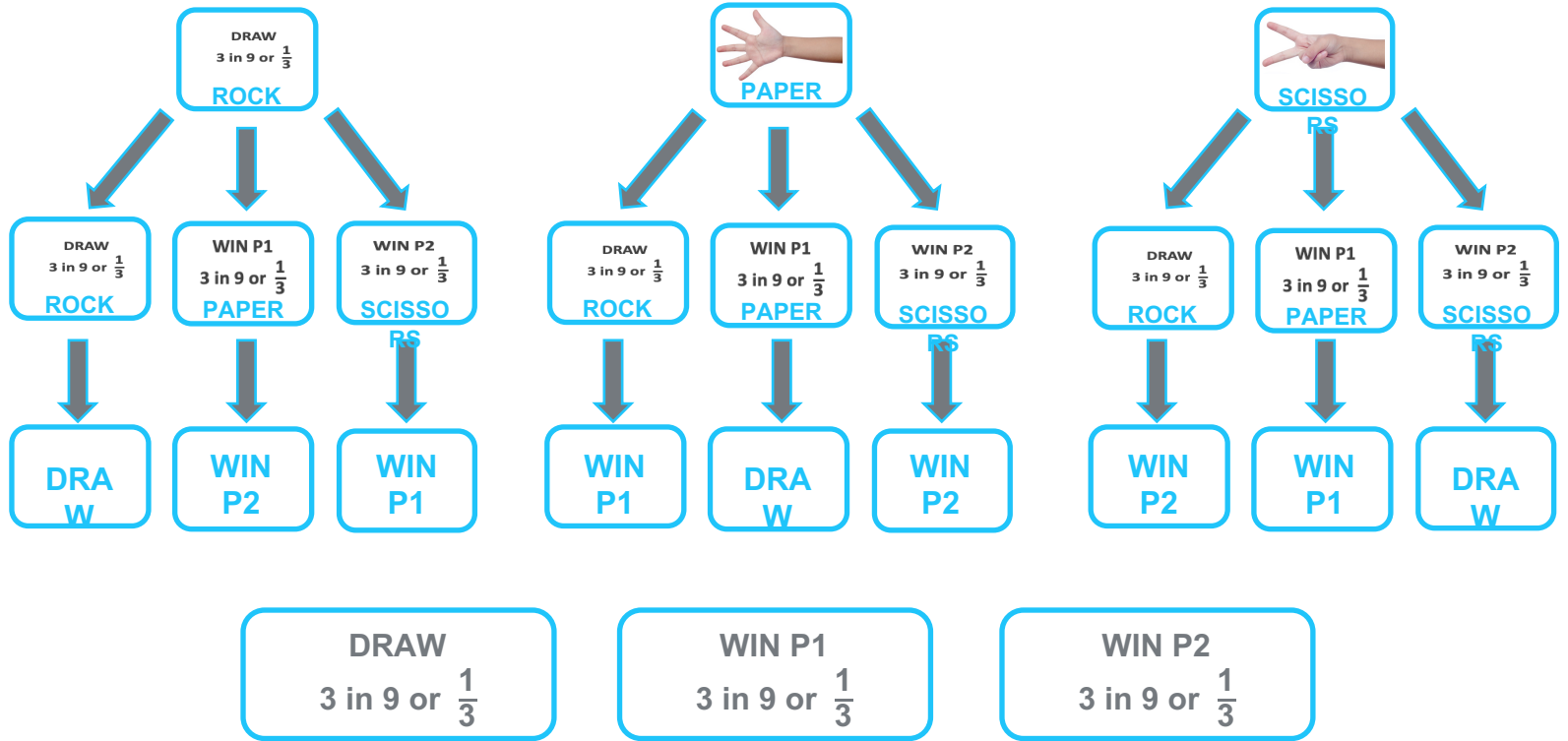
PLAYER 2












WIN P2
3 in 9 or $\frac{1}{3}$

PLAYER 1






PLAYER 2



<div style="text-align: right; padding-right: 5px;">P1</div> <div style="text-align: left; padding-left: 5px;">P2</div>	 ROCK	 PAPER	 SCISSORS

<p>P1</p> <p>P2</p>	 <p>ROCK</p>	 <p>PAPER</p>	 <p>SCISSORS</p>
 <p>ROCK</p>			
 <p>PAPER</p>			
 <p>SCISSORS</p>			

<div style="text-align: right; padding-right: 10px;">P1</div> <div style="text-align: left; padding-left: 10px;">P2</div>	 ROCK	 PAPER	 SCISSORS
 ROCK	DRAW	WIN P1	WIN P2
 PAPER	WIN P2	DRAW	WIN P1
 SCISSORS	WIN P1	WIN P2	DRAW

P2 \ P1		P1		
		 ROCK	 PAPER	 SCISSORS
ROCK	DRAW	WIN P1	WIN P2	
 3 in 9 or PAPER	WIN P2	DRAW	WIN P1	
 SCISSORS	WIN P1	WIN P2	DRAW	

DRAW
3 in 9 or $\frac{1}{3}$

	 ROCK	 PAPER	 SCISSORS
 ROCK	DRAW	WIN P1	WIN P2
 PAPER	WIN P2	DRAW	WIN P1
 SCISSORS	WIN P1	WIN P2	DRAW

PLAYER 1 WINS
 3 in 9 or $\frac{1}{3}$

		P1		
		 ROCK	 PAPER	 SCISSORS
P2	 ROCK	DRAW	WIN P1	WIN P2
	 PAPER	WIN P2	DRAW	WIN P1
	 SCISSORS	WIN P1	WIN P2	DRAW

PLAYER 2 WINS
3 in 9 or $\frac{1}{3}$

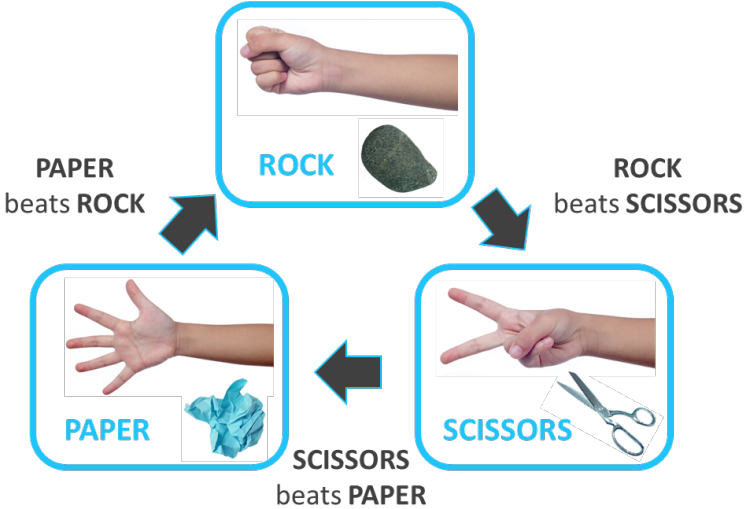
P1 P2	 ROCK	 PAPER	 SCISSORS
 ROCK	DRAW	WIN P1	WIN P2
 PAPER	WIN P2	DRAW	WIN P1
 SCISSORS	WIN P1	WIN P2	DRAW

DRAW
3 in 9 or $\frac{1}{3}$

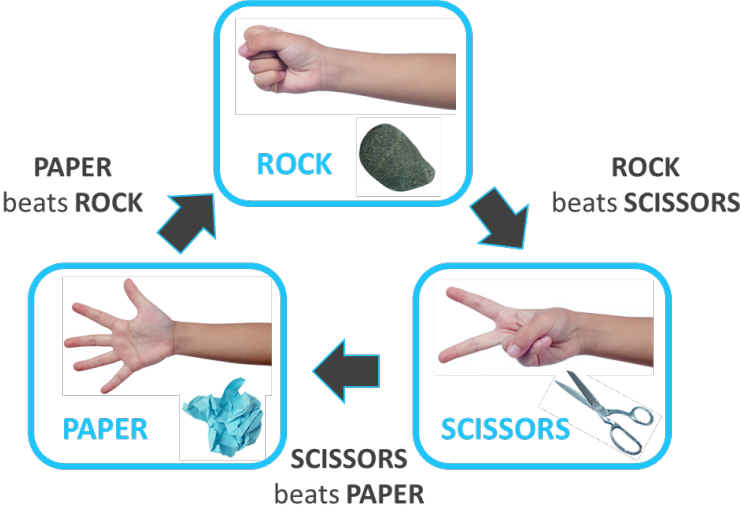
PLAYER 1 WINS
3 in 9 or $\frac{1}{3}$

PLAYER 2 WINS
3 in 9 or $\frac{1}{3}$

Is it really random?



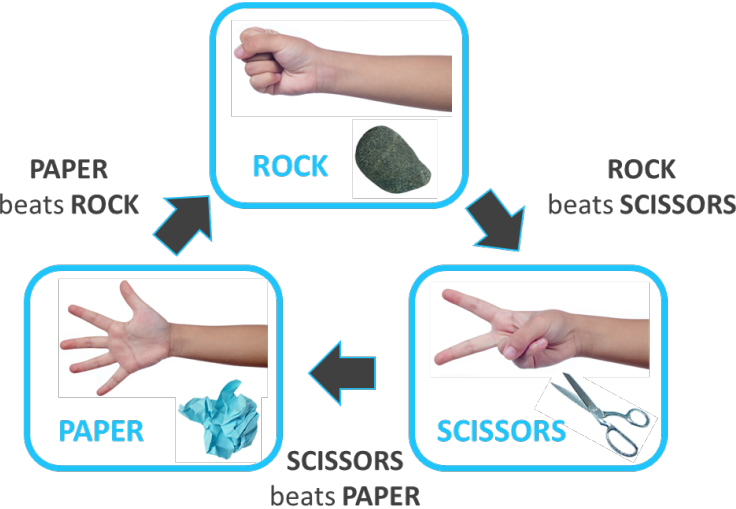
When a person wins, they tend to make the same move again.



If your opponent wins with **SCISSORS**, what would be your best move in the next game?

If your opponent wins with **ROCK**, what would be your best move in the next game?

When a person loses, they tend to change their play in the next game.



If your opponent loses with **PAPER**, what would be your best move in the next game?

If your opponent loses with **SCISSORS**, what would be your best move in the next game?

IF YOU WIN THE GAME

On your next move, play what your opponent played; for example:

You play...	Your opponent plays...		Next time, you should play...
 SCISSORS	 PAPER	YOU WIN!	 PAPER

IF YOU LOSE THE GAME

On your next move, play what was not played; for example:

You play...	Your opponent plays...		Next time, you should play...
 ROCK	 PAPER	YOU LOSE!	 SCISSORS

Extension

Complete the table to show the number of times the dice should land on each number if it is rolled 36 times.

Roll the dice 36 times and record the results.

Write a sentence or two commenting on the results of the experiment.

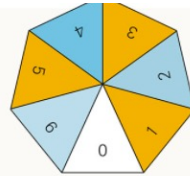
Dice lands on:	Number of times it will land like that	
	Probability	Actual number
1		
2		
3		
4		
5		
6		

Challenge/ Additional Task

Play Tran's game: Part 2

You will need:

- A 7-sided spinner (Trace it and glue onto card)
- Seven players with 10 counters each
- A "banker" with a bank of 50 counters
- Seven cards numbered 0–6 for each player.



- 1 The "banker" needs to find out the chances of someone winning.
 - a What is the chance of the spinner landing on any particular number? ____
 - b The person guessing the correct number receives six counters. If seven people choose a different number each and the spinner lands on six, how much does the "banker" put in the bank? ____

How to play the game

- 2 The "banker" writes, "My starting balance is 50 counters" on a sheet of paper. Each player draws a Win-Lose table with 13 rows and 5 columns similar to this:

My Win-Lose Table				
Turn	Guess	Win	Lose	Balance
Starting balance:				10 counters
1st turn	1 counter			
2nd turn	1 counter			
etc.				
- 3 Each player guesses the number the spinner will land on by placing a card with that number on it in front of themselves.
 - a Each player puts one counter in the middle and writes this in the "guess" column.
 - b Somebody spins the spinner.
 - c The person with the winning number gets six counters. The "banker" gets whatever is left over.
 - d Players complete the row on their Win-Lose table. The "banker" writes their own new balance.
 - e Repeat Steps 2 to 7 until the end of the tenth turn.

Complete the sentences.

- My final balance was ____ counters.
- The balance for ____ players had decreased by the end of the game.
- The balance for the "banker" increased/decreased (underline one).