

Crazy Choices

In science have you ever done an experiment that you thought would turn out one way, but it ended up doing something different? That could be because of the nature of probability. In science you do things over and over to make sure you have the correct results. In math you repeat things over and over to make sure your experimental results are as close to the theoretical result as possible. The actual results from your experiments are called statistics. While the possibility you may or may not get a certain result has to do with probability.

Vocabulary:

- ◇ **outcome** - Each outcome is a **complete description** of a situation that can happen as a result of an experiment (just the important information.)
- ◇ **probability** - The measure of how likely it is for an event to occur.

$$\frac{\# \text{ successes}}{\# \text{ attempts}}$$

The probability of an event is always a number between zero (impossible) and 100%.(certain to happen).

Activity:

Play the [Crazy Choices Game](http://www.shodor.org/interactivate/activities/chances/index.html)

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in groups (2-4 people per group) using computer(s) or various random number generating devices (dice, spinners, etc.). Before beginning play, predict the chances each player and device has of winning. Keep the following statistics:

1. number of games played
2. number of times each player won
3. experimental probability of winning = $\frac{\# \text{ wins}}{\# \text{ games}}$ (Change to percent)

Play a lot of games (50-100) if you want to obtain reliable statistics. The goal of the game is to determine which player has better chances of winning if players use different devices. For example, compare the chances of the player who flips a coin and the chances of the player who rolls a six-sided die.

If the total number of outcomes is the same for all players, it is easy to compare their chances.

- ◇ How do we compare the chances of the players if the total number of outcomes is different?
- ◇ Can we do it with experiments?
- ◇ Can we predict the results of the experiments approximately?
- ◇ What happens to experimental probabilities when we collect more and more data on the same game?