

# UNIVERSAL WHEEL OF CHANCE

## Brief Description:

This exhibit is a large wheel with the numbers from 0 to 99 that visitors spin. The numbers are labeled with the same set of icons that are used on the Number Line. For example, the Fibonacci numbers are labeled with a rabbit and the primes are labeled with an atom. There is also a set of cards labeled with the same symbols (an atom, a rabbit, etc.).

## Objectives:

Spinning the wheel is a great way to develop a sense of probability and explore the likelihood and distribution of outcomes. Students can calculate the probabilities for the outcomes they get, and they can also devise their own probability-based games to play.

## Links to Websites:

<http://mathmidway.org/Training/chance.php>

<http://www.shodor.org/interactivate/activities/RacingGameWithTwoDie/>

## Vocabulary:

Cake Numbers	Constructible Polygon Numbers
Counting Numbers	Cubes
Event	Factor
Factorials	Fibonacci Numbers
Highly Composite Numbers	Integers
Outcome	Pentagonal Numbers
Perfect Numbers	Pizza Numbers
Powers of Two	Primes
Probability	Squares
Tetrahedral Numbers	Triangular Numbers
Whole numbers	Zero

## Before:

- ⊙ (*Level 1, 2, 3*) The Universal Wheel of Chance is like a die with 100 sides, so you can do some activities with your students starting with six-sided dice. There's an interactive version of this activity here:  
<http://www.shodor.org/interactivate/activities/RacingGameWithTwoDie/>
- ⊙ Students choose a possible sum of two six-sided dice (2-12) to be their number. When the dice are rolled, the students who have the total as their number get to move on the board. They continue to roll the dice until one player (or players) reaches the goal (See attached spreadsheet).
- ⊙ (*Level 1, 2, 3*) Familiarize students with all of the different sets of numbers used in the Wheel of Chance: Primes, Squares, Triangular numbers, Perfect numbers, Powers of 2, Cubes, Highly Composite numbers, Pizza numbers, Cake numbers, Pentagonal numbers, Constructible Polygon numbers, and Tetrahedral numbers.

## Dice Race!

Choose a number from 2-12. When the two dice are rolled, if the total is your number, place an X in the column under your number. Race against your classmates to see which number reaches the finish first.

2	3	4	5	6	7	8	9	10	11	12
<b>START</b>										
<b>FINISH</b>										

After you've finished the race, fill out this table. In each box place the sum of its row and column value to create an addition table. This shows all the possible outcomes when two dice are rolled. Each of the 36 outcomes is equally likely.

<b>Dice</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>1</b>						
<b>2</b>						
<b>3</b>						
<b>4</b>						
<b>5</b>						
<b>6</b>						

Questions to discuss: Do you see a pattern here? What does this pattern have to do with the winner of the dice race?

The diagonal pattern shows that 7 should occur most often and 2 and 12 least often, with the others in between. This means the students who choose 7 are the likeliest to win the race, although it's possible for someone else to win because unlikely things can happen!

**During:**

- ⊙ (*Levels 1, 2, 3*) Ask students to study the Wheel of Chance writing down possible outcomes that we can study, such as odd numbers and even numbers, symbols, number without a symbol vs. number with a symbol, etc. Predict the distribution of the outcomes and then make a list of outcomes. As students spin the Wheel of Chance, record the number of times it lands on the possible outcomes.

**After:**

- ⊙ (*Levels 1, 2, 3*) Use the data that the students gathered to compare predicted distribution of outcomes with actual distribution of outcomes.