



# Penny Toss

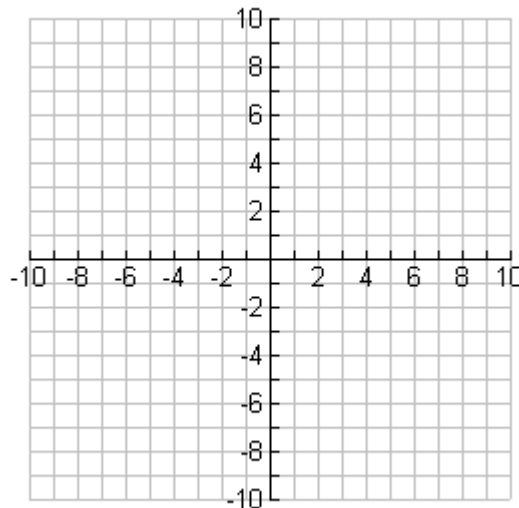
This group activity will demonstrate the process of exponential growth and decay.

**Directions to Students:** Place the pennies on your desk. Count the pennies to determine your starting value. One desk will be used for tossing the pennies and another desk will be used for "banking" the pennies. When pennies are "banked", they are NOT in play.

## Part 1 - Growth:

- Place all but 6 pennies in the bank.
- Place the 6 pennies in the paper cup. Shake and toss. Count the number of HEADS that were showing. Return the 6 pennies to the paper cup along with one additional penny from the bank for every HEAD that was showing. Record in the table the total number of pennies in the cup after each toss. Repeat the process for 8 tosses.
- Plot the data in a scatter plot.
- Using the formula  $y = a(1 + r)^x$  for exponential growth, write and plot a function representative of this experiment.
- Compare the graphs of the scatter plot and the function.

Toss	Pennies
1	6
2	6 + _____
3	
4	
5	
6	
7	
8	



## Part 2 - Decay:

1. Place all of the pennies in the paper cup. Record the starting number of pennies as Toss 1.
2. Shake and toss. Count the number of pennies that show HEADS. Bank all of the pennies showing HEADS and return the others to the paper cup. Record in the table the total number pennies in the paper cup after each toss. Repeat the process until only one penny remains.
3. Plot the data in a scatter plot.
4. Using the formula  $y = a(1 - r)^x$  for exponential decay, write and plot a function representative of this experiment.
5. Compare the graphs of the scatter plot and the function.

Toss	Pennies
1	
2	
3	
4	
5	
6	
7	

