Applied Statistics

Domain	**Designing Studies**	
Cluster	**Design and implement a plan to collect and analyze data.**	
Standard(s)	M.ASHS.9	Evaluate the results from a given data-generating process to determine consistency between theoretical and experimental probabilities. Instructional Note: Include the Law of Large Numbers.

Content Examples:

» Video for law of large numbers:
https://www.youtube.com/watch?v=MntX3zWNWec

» Theoretical and experimental probabilities:
https://youtu.be/tXlcE_K_C-Y

Relevant Content

» Probability basics unit on Khan Academy:
https://www.khanacademy.org/math/probability/probability-geometry/probability-basics/v/basic-probability

Vocabulary:

» Experimental Probability: Experimental probability is the probability calculated during experiments, direct observation, experience, or practice.

» Experimental Probability = Relative Frequency

» Law of Large Numbers: If we observe more and more repetitions of any chance process, the proportion of times that a specific outcome occurs approaches a single value, which is known as the probability of that outcome.

» Theoretical Probability: The theoretical probability of an event is the number of ways the event can occur divided by the number of total outcomes.

Three fun probability games and projects:
http://www.teachforever.com/2009/08/three-fun-probability-games-and.html

Assessment Links or Tasks

» Probability simulation applet:
http://digitalfirst.bfwpub.com/stats_applet/stats_applet_10_prob.html

» Included below are *Instructions for the Probability Simulation*

Probability Simulation

When you toss a coin, there are only two possible outcomes, heads or tails. On any one toss, you will observe one outcome or another—heads or tails. Over a large number of tosses, though, the percentage of heads and tails will come to approximate the true probability of each outcome.

In this applet, you can set the true probability of heads for your virtual coin, then toss it any number of times. Notice how the proportion of tosses that produce heads can be quite variable at first, but will eventually settle down to the true probability.

Set the probability of heads (between 0 and 1.0) and the number of tosses, then click “Toss”. The outcomes of each toss will be reflected on the graph. Check the box to show a line with the true probability on the graph. Click “Reset” at any time to reset the graph.