Dice Roll: Empirical vs. Theoretical **Student Activity**
An Activity for the Nspire TouchPad TI-Nspire
Algebra II or Statistics

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Dice Roll Activity Review

? What are the probabilities when tossing a number cube (die)?
  - For Theoretical divide the number of successes by the total possibilities
  - Express all results in decimal format for easier comparison.
  - For Empirical:
    - Roll a die 18 times. Record Tally then change to a decimal.
    - Use TI-Nspire to simulate 180 rolls
    - Now simulate 1800 rolls

Dots showing	1	2	3	4	5	6
Theoretical Probability						
Tally (out of 18)						
Change to a decimal						
TI-Nspire: 180 rolls						
TI-Nspire: 1800 rolls						

? What is the probability of getting any particular number on the Die? _____

? Is the probability the same for each side of the die? _____

? How did the counts change as the number of rolls increased? _____

? How does the graph support your answer? _____

? What would be the probability of getting a 3 or 4? _____

? What would be the probability of getting a 3 and 4? _____

? What would be the probability of getting a number greater than 2? _____

? What would be the probability of getting at least a 2? _____

? If the die had eight sides, what would be the probability of getting 1? ___ 7? ____

Dice Roll: Empirical vs. Theoretical **Student Activity**
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Algebra II or Statistics

- What are the probabilities when tossing a pair of dice?
  - For Theoretical divide the number of successes by the total possibilities
  - Express all results in decimal format for easier comparison.
  - For Empirical:
    - Roll dice 18 times. Record Tally then change to a decimal.
    - Use TI-Nspire to simulate 180 rolls
    - Now simulate 1800 rolls

Dots Showing	2	3	4	5	6	7	8	9	10	11	12
Number Possible Combinations: (1,1) = 1: (1,2) & (2,1) =2;	1	2									
Theoretical Probability											
Tally (out of 18)											
Change to a decimal											
TI-Nspire: 180 rolls											
TI-Nspire: 1800 rolls											

2. **Analysis**
   - What is the probability of getting 7? _____ 11? _____
   - Is the probability the same for each combination? _____
     - Why (not) _____
   - How does the graph support your answer? _____
   - What would be the probability of getting a 3 or 4? _____
   - What would be the probability of getting a 7 and then 11? _____
   - What would be the probability of getting a number greater than 8? _____
   - What would be the probability of getting at least an 8? _____
   - If the dice had eight sides each,
     - what would be the probability of getting 16? _____ 14? _____
   - Contrast the distributions of the one die versus the pair of dice?
   - Which sample size produces a distribution that is closest to the theoretical?
   - What conclusion(s) can you draw from this activity?