**Open the TI-Nspire document WhatsNormal *StaRT***

Suppose you were to roll a standard die. The result is considered a success if the die shows a 3. This occurs with a probability of 1/6.

What if you roll the die 300 times? About how many times would you expect a success? We *expect* about 50, but we also expect our results to be different from trial to trial.

In statistics, this is called **sampling variability**. The collection of all possible successes from all possible trials would be called the **sampling distribution**.

On page 1.4, a simulation of this experiment (100 trials of rolling a die 300 times) has been performed.

1 row = 1 trial

Column B = # of successes in each trial.

1. What happened in the first trial of this experiment? The second? The 100th?

Page 1.6 shows a histogram of the successes. This histogram is an approximation of the sampling distribution of all possible successes.

1. What conjectures can you make about the distribution of the number of success?

The normal curve on the page 2.2 is controlled by sliders. The dashed, red line represents the position of the mean, and the dotted, blue lines cut the area beneath the curve into vertical cross­sections, each with a width equal to one standard deviation. The grey shaded area is a calculation of the area under the curve between the two points on the horizontal axis. You can control this area by moving the black dots on the axis.

1. What conjectures can you make about the areas under a normal distribution curve?

It is common practice in statistics to think about the area contained within one, two, and three standard deviations from the mean. If you haven't already, return to the previous curve and approximate these probabilities.

1. What percent of the data is within one standard deviation? What about two standard deviations? What about three standard deviations?

In statistics, the collection of these three probabilities is called the **empirical rule**. On the page 2.5, you will find the histogram from the dice-rolling simulation.

1. Use what you know about the empirical rule to determine if this distribution roughly follows a normal distribution. Provide numerical evidence of you claim.