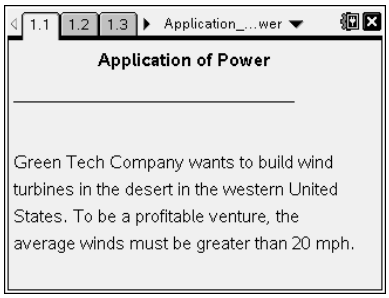
Application of Power
Student Activity

Name _____
Class _____

This lesson uses the concept of power to explore how the probability of rejecting the null hypothesis when it is false plays a role in a real-world scenario.



Open the TI-Nspire document *Application_of_Power.tns*.
Move to page 1.2.

Press ctrl ▶ and ctrl ◀ to navigate through the lesson.

Green Tech Company wants to build wind turbines in the desert in the western United States. To be a profitable venture, the average winds must be greater than 20 mph. To perform a test of the area, the company takes the average of 15 wind readings and sets up the hypotheses as the following:

H_0: $\mu \leq 20$

H_a: $\mu > 20$

If the null hypothesis is rejected, the site will be deemed profitable and the company will build the turbines.

1. a. What does the power of the test represent in terms of the hypotheses?

   b. What does the power of the test represent in terms of the company's decision for the site?

2. When the company tests the site, would they want power to be closer to 1 or 0? Explain your reasoning.

Move to page 1.6.

Click the arrows of the sliders to change **n** and **α**, where *n* represents the number of readings and α is the alpha level.

3. a. How can you adjust **n** and **α** to get the best power value?

   b. Which variable has the most impact?

4. Drag the point labeled **μa** to change the true wind average.
   a. What do you notice? Why do you think this happens?

   b. Explain what this means in terms of the probability of determining whether the site is profitable to build on.