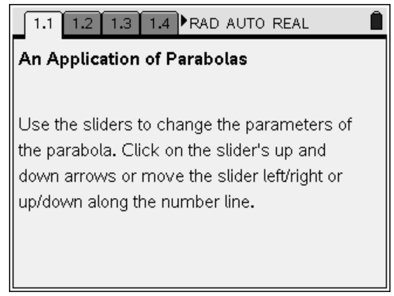
An Application of Parabolas
Student Activity

Name ________________
Class ________________

Open the TI-Nspire document *Application_of_Parabolas*.



Real-world problems can be modeled by various types of functions. A parabola or quadratic function often is used to model objects for which gravity plays a role. You will discover how the parameters of an equation of a parabola affect its graph and affect the real-world problem.

Move to page 1.2.

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

Liam is practicing his golf swing at the local driving range. For his first hit, the path of the golf ball is modeled by the equation $y = -0.35(x - 11)^2 + 43$, where x represents the horizontal distance, in feet, that the ball travels until it first hits the ground.

Move to page 1.3 and view the graph of the equation.

1. What do you think the value of y represents?

2. The vertex form of a parabola is $y = a(x - b)^2 + c$. In the equation $y = -0.35(x - 11)^2 + 43$, what is the value of b and what does it represent? What is the value of c and what does it represent?
Use the point on the graph to test your conclusion.

3. Use the slider to change the value of a.
   a. How does it affect the graph?

   b. How does this relate to the problem?

   c. Why does the value of a need to be negative?

4. Use the sliders to change the values of b and c. What effect do they have on the graph that the value of a does not?

Move to page 2.1.

On Liam's second hit, the ball lands with a greater horizontal distance than the first.

Move to page 2.2.

Use the sliders to find a path that could represent Liam's second hit. *(Remember, the starting point needs to stay about the same.)*

5. What is the equation of the path of the ball?

6. For the new equation, did you need to change all of the values of *a*, *b*, and *c*, or just one or two? Explain.