

**CONCEPT** If we have the equation of a quadratic, we can create its graph. This graph will be a parabola.

## BACKGROUND

**PARABOLA:** the name of the shape of a quadratic graph. It looks like a “U”. Axis of symmetry: the line about which the parabola is symmetric.

**VERTEX:** the point at the extreme end of the parabola. It is the point where the graph appears to “turn around”.

## APPLICATION

Take a tennis ball and toss it into the air. The path of the ball will follow a parabola. You can experiment by changing the speed of the ball and the angle at which you throw it. This will still be a parabolic path, but one with different coefficients.

This is actually how projectile motion can be calculated. By changing the initial angle and velocity, you can calculate the total distance a projectile will travel, along with where it will land!



## REAL WORLD CONNECTIONS

For any string-like material suspended from two ends, the string will hang down in an approximately parabolic shape. Elevated power lines fit this category: the wires are suspended at each end, and have a low point in the middle. Adding tension to the wire is the mathematical equivalent of changing the coefficients, changing the overall ground clearance of the wire (i.e. the y-coordinate of the vertex).

