Quadratic Equations Lesson Plan 2

**Title:** Graphing quadratic equations

**Objectives:** Students will learn to identify and sketch the general forms of quadratic equations. The student learns the affects on the graph of changes in the leading coefficient and the constant term.

**Materials:**
- **Teacher:** small foam ball
  - Dry erase board and marker
  - TI-83+ view screen
- **Students:** graph paper (provided by student)
  - Pencil (provided by student)
  - Access to a TI-83+

**Introduction: (Engage and Explore):** Begin the lesson by reviewing the concepts learned in the previous lesson, specifically that quadratics are polynomials of degree two. Write the general formula for a quadratic on the board. Next take the small ball and toss it in the air and catch it with the other hand at the same height. Ask the students to draw what the see as the path of the ball.

**Procedures:** After the students sketch the graph, put a polynomial equation on the board and have the students pick random values of x and determine the corresponding y values. Then have them plot the points on their graph paper. Make sure that they get points from both sides of the parabola. Do this a few times (make sure that some have positive and some have negative leading coefficients.) until students get the right idea about the shape of the graph.

Now have the students graph \( y = x^2 \) on their calculator while you do the same on the view-screen. Then have them graph \( y = 5x^2 \) on the same screen. Have the students discuss what happens when ‘a’ is changed, when ‘c’ is changed and when everything is multiplied by negative 1.

**Adaptations:** If there are not enough calculators for everyone, divide the class into small groups and let them work together with one calculator. If there are no calculators and there is access to the internet, they are several interactive graphing programs available such as [http://www.7stones.com/Homepage/Publisher/p3.html](http://www.7stones.com/Homepage/Publisher/p3.html).

**Discussion Questions:** Ask students how they can find the minimum or maximum point? Let them hypothesis on what coefficients change the location of the vertex.

**Assessment/Evaluation:** Students will show mastery of concepts through worksheets and tests.

**Extensions:** Assign a few homework problems to be graphed by hand and by calculator.
**Suggested Readings:** Alexander, *Bob Explore Quadratic Functions with the TI-83 or TI-82*, 1997

**Links:** [http://www.edhelper.com/algebra.htm#AT6](http://www.edhelper.com/algebra.htm#AT6), Gives great puzzles and worksheets for polynomials.

[http://www.7stones.com/Homepage/Publisher/p3.html](http://www.7stones.com/Homepage/Publisher/p3.html), Interactive graphs

**Vocabulary:** quadratic, parabola,

**Academic Standards:** ξ111.32.a. (5) Tools for algebraic thinking. Techniques for working with functions and equations are essential in understanding underlying relationships. Students use a variety of representations (concrete, numerical, algorithmic, graphical), tools, and technology, including, but not limited to, powerful and accessible hand-held calculators and computers with graphing capabilities and model mathematical situations to solve meaningful problems.

ξ111.32.d(1) The student understands that the graphs of quadratic functions are affected by the parameters of the function and can interpret and describe the effects of changes in the parameters of quadratic functions.

**Time of Lesson:** 1 50-minute lesson

**Tips on teaching:** Instead of tossing a ball from one hand to another, have the students toss the ball back and forth to each other.