Title: Introduction to quadratics

Objectives: For students to learn what a quadratic is and its different representations. Students will demonstrate mastery of linear functions and connect these concepts to quadratic concepts.

Materials: Teacher: dry erase board and marker or overhead and marker
Students: Paper (furnished by students)
Pencil (furnished by students)
Textbook (furnished by school)
Worksheet (furnished by school)

Introduction: (Engage and Explore) Review linear functions by playing linear relay game. Students are divided into rows of 4, every student must close their eyes and the teacher puts 4 linear equations on the board. The last three have question marks as the constant term. The teacher tells the people in the first seat of each row to open their eyes and solve the first linear equation. After solving for ‘x’, the first person taps the second person and gives them the number they found for x. The second person then replaces the questions mark in the second equation with this number and solves for ‘x’. This continues until the fourth person solves their equation and raises their hand. If they are correct, the team gets a point. This is a fun way to review the linear functions.

Procedures: Start by multiplying two linear expressions together. Have students point out the differences of the product and the factors. Discuss degrees, constant term and leading coefficients. Show students the different forms for the quadratic. Have students note the form of the product of $(x + y)(x - y)$.

Adaptations: If students are unsure about the differences in first and second degree equations, it could be that they are struggling with exponents. Some students may need a review of multiplying with exponents.

Discussion Questions: To help students begin to think about degrees of polynomials and multiplying higher degree polynomials, ask students what degree expression they would get if they multiplied three first degree equations together, two second degrees, etc.

Assessment/Evaluation: Students will be given a worksheet to do as homework. The sheet contains problems which multiply two linear expressions together. It also contains questions concerning degrees, leading coefficients and constant terms. Later these topics will be covered by a quiz or test.

Extensions: Some students will catch on quickly and become bored. Allow these students to work in groups with graph paper and begin to plot by hand the coordinates for a specific quadratic.
**Suggested Readings:** Read appropriate section in textbook.

**Links:** A good link for the history of the quadratic: [http://www-history.mcs.st-and.ac.uk/history/HistTopics/Quadratic_etc_equations.html](http://www-history.mcs.st-and.ac.uk/history/HistTopics/Quadratic_etc_equations.html)

**Vocabulary:** Linear, Quadratic, leading coefficients, constant terms, degrees

**Academic Standards:** 111.32.b1.E The student interprets and makes inferences from functional relationships.  
111.32.b4.B The student uses the commutative, associative and distributive properties to simplify algebraic expressions.

**Time of Lesson:** Lessons are for 50 minute periods