Know When To Roll Them:
A Real and Complex Numbers Activity

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This is an abbreviated version of the handout used in session 383. The
The full handout cannot be posted online because of copyright issues.

The objective of this activity is to model a quadratic equation using hands-on materials. Please see August 2009 *Mathematics Teacher* for the complete article and explanations as well as extensions for calculus. If time permits, we will begin the linear exploration with the tennis ball. For the complete companion activity on lines and geometric transformations, please see the February 2010 *Mathematics Teaching in the Middle School*. Please email Sharon Taylor at the address on the cover page if you would like a pdf version of these articles.

CCSS Addressed:

MCC9-12.N.CN.7	Solve quadratic equations with real coefficients that have complex solutions.
MCC9-12.A.SSE.3	Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
MCC9-12.A.SSE.3a	Factor a quadratic expression to reveal the zeros of the function it defines.
MCC9-12.A.REI.4	Solve quadratic equations in one variable.
MCC9-12.F.IF.7	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
MCC9-12.F.IF.7a	Graph quadratic function and show intercepts, maxima, and minima.
MCC9-12.D.ID.6a	Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize quadratic models.

Activity Summary:

Using a tennis ball soaked in water and large easel grid paper, students will create their own parabola. The easel paper must be placed at an angle and it is suggested that students practice with a dry tennis ball first to make sure they get a complete parabola.

Students then place axes according to their "parabola information sheet" which tells them how many zeros their parabola has, whether the parabola opens up or down, and what quadrant the vertex is in.

Once students place their axes according to the instructions specific to their group, they work through a series of questions asking for ordered pairs, finding the vertex and intercepts (by inspection and algebraically), and finding a quadratic fit model using the graphing calculator.

For the full handout that contains all the questions used in the activity, please email Sharon Taylor at the address on the cover page.