Generic Lesson Plan Template

You should submit this form in addition to any computer generated files/documents/models to your group folder on Angel. Please create a .zip file and upload the group of files as a single archive.

Name: Kevin Westrich
Grade level(s)/Subject taught: Grade 10-12, Algebra 2 Honors (Math B)
Objectives: Students will be able to calculate the vertex and intercepts of a quadratic equation that models real world phenomenon. Students will be able to use interactive physics to set up a real world model.

Please provide a rich **one-page, single-spaced**, description or a *vision* of your best thinking on a way or ways you might teach the planned lesson. (approximately ½ page for the teacher role, ½ page for the student role). Also, construct a tentative rubric that you might use with your students (see example)

Items to include in your lesson plan: (Choose your discipline/concepts from your own area).

1. *Write* theMathematical Concept or "key idea" that modeling will be used to teach: (e.g. Students use mathematical modeling/ multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships)

4A. Represent problem situations symbolically by using algebraic expressions, sequences, tree diagrams, geometric figures, and graphs. 4J. Determine the effects of changing parameters of the graphs of functions. 4K. Use polynomial, trigonometric, and exponential functions to model real-world relationships. 4N. Use graphing utilities to create and explore geometric and algebraic models. 7B. Represent and analyze functions, using verbal descriptions, tables, equations, and graphs. 7C. Translate among the verbal descriptions, tables, equations, and graphic forms of functions. 7E. Apply linear, exponential, and quadratic functions in the solution of problems. 7G. Model real-world situations with the appropriate function.

and/or…

1b. *Write* the Science Concept or "key idea" that modeling will be used to teach: (e.g. Organisms maintain a dynamic equilibrium that sustains life).

Students will work with physics concepts such as the acceleration due to gravity, and some basic concepts in projectile motion.

Materials: Students will need to have a TI graphing calculator and access to a computer lab with Excel and Interactive Physics.

"…a rich **one-page, single-spaced**, description or a *vision* of your best thinking…"

Prompts:

1. How will you assess the prior knowledge of the student?

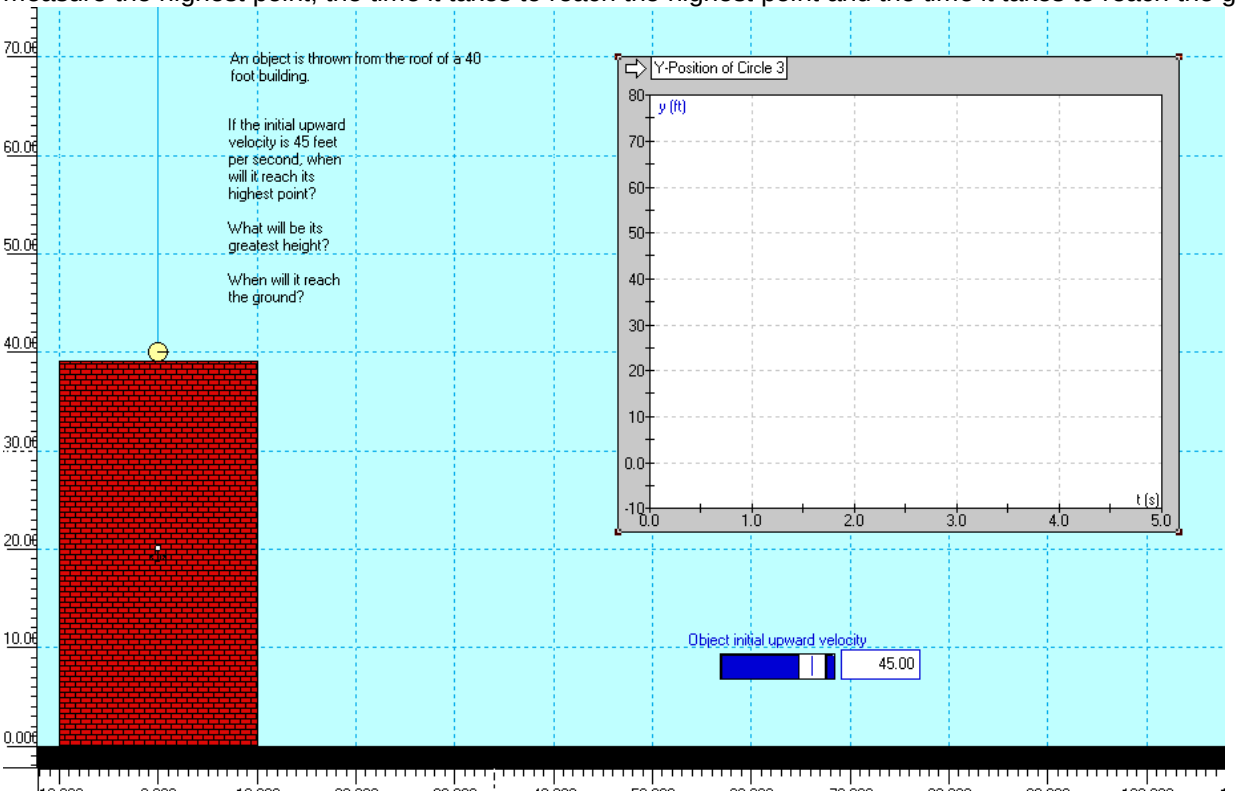
This lesson will come toward the end of a unit on quadratic polynomials. Students will have studied functions and will be able to calculate the vertex and intercepts of any given quadratic function. They will have had several homework assignments and a quiz covering the techniques for finding the vertex and intercepts of a parabola.

2. How will you begin the lesson?

Students will be given some warm-up questions where they will need to find the maximum point and *x*-intercepts of a quadratic function.

3. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Actions)

After going over the warm-up questions, students will be presented with a word problem. Where an object is thrown upward off of a building or cliff and students will need to find the maximum height reached and the total time until it reaches the ground. We will use interactive physics to build a model for the word problem and try to measure the highest point, the time it takes to reach the highest point and the time it takes to reach the ground.



After running the model data will be exported into excel and then from excel into a graphing calculator. Students can run a quadratic regression on the data and come up with a model function. By calculating the vertex of the function and its *x* and *y* intercepts the measurements from the interactive physics model can be checked. I would like students to recognize the pattern that the parameters a, b, and c for the quadratic function represent the half of the acceleration due to gravity, the initial upward velocity, and the initial height respectively.

4. How will you assess the learning for the lesson?

Students will be given an assignment in which they will need to solve several word problems in which they are given an initial upward velocity, and an initial height. One twist could be to have them calculate the same values if the building were on the moon.

I will collect the assignment from students and grade it and their participation using the following rubric

Rubric

	3	2	1
Objective Completion	Student completed the word problems completely and accurately	Student made some errors in calculation of maximum point and x-intercept but used a correct function model	Student did not create a correct function model or accurately calculate the desired values
Usage of Interactive Physics	Student created an accurate working interactive physics model.	Student needed some assistance in getting model to work correctly	Student was unable to create an interactive physics model.
Participation	Student was on task and participating in class	Student needed some redirection	Student did not participate in this class activity.