CMST SCOLLARCITY Lesson Plan Template-Lesson Plan using **TI Technologies** (Due Tuesday, July 27th)

Submit as hard copy AND electronically through ANGEL

Name: Brian Bizzigotti
Grade level(s)/Subject taught: Geometry Grade 10
Objectives: (Remember…*How will the modeling tool help the student better learn the objective?)* Students will display the ability to accurately graph a quadratic equation.

Items to include in your TI Technologies lesson plan: (use *your* area/discipline/concepts).

For the math teacher:

1. *Write* the Mathematical Concept or "key idea" that TI Technologies 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)

4. Students use mathematical modeling/multiple representation to provide a means of presenting, interpreting, communicating, and connecting mathematical information and relationships. 7. Students use patterns and functions to develop mathematical power; appreciate the true beauty of mathematics, and construct generalizations that describe patterns simply and efficiently

and/or…

For the Science teacher:

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

For your **TI Technologies** lesson and using the following prompts, 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 using the TI technology. Pay special attention to the modeling package in your description. Also, construct and submit a tentative rubric that you might use with your students. ** see example page 5

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

Prompts:

1. How will you assess the prior knowledge of the student?
2. How will you begin the lesson?
3. What are the teacher and students doing every 5-10 minutes? (Teacher Actions and Student Actions
4. How will you assess the learning for the lesson?
5. How will TI be integrated into your teaching? (i.e. you may want to discuss a problem or describe how you might use the chosen modeling package in your plan. How does the model/tool help the concept(s) to be taught)?

Using _the TI 83 graphing calculators___, I plan on having my students…graph quadratic equations.

(software / modeling package(s)

For the beginning of class I will have the students graph a simple quadratic equation such as $y=x^2$ by hand. I will supply the x values to be plotted for them in a table. The students will use the calculators to find the corresponding y values. As the students are completing the tables and graphing their results, I will walk the room to monitor the abilities of the students at plotting points and their experience with the graphing calculators. (5 -10 min) After all students have completed the graph of $y=x^2$ by hand we will discuss how much work it was completing the table of values by hand. Naturally the students will want an easier way to get the coordinates of the points and ask if the calculator can do it. I will then use the overhead display on my calculator and have the students follow me step by step on how to type the equation into the calculator using the y='s button. We will then discuss how to get the graph on the calculator by using the zoom button and selecting a standard zoom. After all students are able to get the graph onto the calculator we will talk about what is needed to receive full credit for a graphing question on the math A test. I will explain that they can not draw a sketch of the graph and actually have to complete a table of x,y values and plot the correct points as we did by hand. This will lead to the use of the 2^{nd} button to get to the table of values. I will have all the students get the table on their calculators, and then have them check to see if it matches the table they made by hand exactly. Some will and some won't so we will then discuss how we may have to adjust the table so that the coordinates we plot will give us a nicely shaped symmetric parabola. The students should then be able to tell me that we need to look for the repeating pattern in the y values of the coordinates we want to plot. I will then show them how they can get the turning point from the table of values and determine if it is a maximum or minimum. (15 min) Once all students are able to get the graph and table of x,y values using the calculator, I will ask them questions such as, "what will happen if I put a 2 in front of the x^2?" As a class we can then examine how making the "a" coefficient of the equation changes the parabola. I will have them graph several quadratics on the same screen using different coefficients to see how "a" can make the parabola wider or thinner. (10 min) I will then ask the students what they think will happen if we add a "+ 3" on the end of the equation. We will then talk about how to clear out old equations and enter new ones in the y='s section and examine how changing the "c" coefficient affects the parabola. (5 min) I will then put a quadratic equation on the board and have the students use the graphing calculator to complete a table of x,y values and a graph of the parabola to be handed in as a ticket out the door. As students are working on this I will circulate the room assessing each students progress with what was taught for the lesson.

RUBRIC

Target	Acceptable	Unacceptable
Student can enter the quadratic function into the graphing calculator		
Student can construct a table of values using the graphing calculator		
Student can get the correct graph of the quadratic and set the standard zoom on the graphing calculator		
Student can transfer graphing data from the graphing calculator to graph paper		

Example: "I was thinking about beginning the class on [modeling X] by using the overhead to ask students what they know about X. From this brainstorming session, I might ask them to get into groups and discuss one or more of the ideas they gave me. After about ten minutes, I would have the students give their ideas on X and write them down on a transparency so they would be able to see them for the entire hour. From here, I would provide a 10 to 15 minute demonstration of the basics of using _____modeling software. I would use an conceptual example that they would find familiar with such as getting a cold and how it is transmitted. From here, I would have students at the computer stations using a prepared guide or tutorial to get them started on basic software usage. I expect that in a short time a number of students would "catch on" rather quickly and be able to help others. …….. By the third lesson, I suspect that most would be well on their way to development of their own or small group models using the _____software. My plan of assessment would probably be a group model so they would gain more confidence in using the software in a meaningful way. After the second or third lesson, I would ask them to choose from a list of thematic or topic areas that fit the software nice and develop a model using the technology. As a product, I may have partners share their model and describe to other small groups how it works. The rubric I design would be general at first so that I might see the kinds of the products the student were capable of creating. From the prototypes, I would hone my rubric to make the modeling product as challenging as possible without making it too difficult." Etc…

For all lesson plans and within the context of the lesson plan(s) you develop, design (add) a rubric that addresses your objectives AND "guides" your students to success in the modeling arena you choose (AS, Stella, GSP, TI, IP). The rubric should have three or four levels or mastery with the highest level [TARGET], which should detail what you might initially expect of the capabilities from a student doing the best s/he can do. **(etc…)**

Ex:

Target	Acceptable	Unacceptable
Model *uses at least 5 functions* of Agent Sheet Software.	?	?
Math / Science Concept thoroughly addressed. Described (*written*) in rich detail.		
Graphs are neat, accurate and based on data from the model.	?	?
Student is very capable of *describing the model to a small group of peers* and is able to respond meaningfully to questions about the model.	?	?
Defines exactly how the modeling software "helped" solve the problem.		