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: Bonnie Bush
Grade level(s)/Subject taught: Env. Sci. 9
Objectives: To introduce students to TI-84 technology To show graphic representation of data

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* the Mathematical 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)

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).

Plant cells contain chloroplasts, the site of photosynthesis. Plants and many microorganisms use solar energy to combine molecules of carbon dioxide and water into complex molecules of carbon dioxide and water into complex, energy-rich organic compounds and release oxygen to the environment. This process of photosynthesis provides a vital connection between the sun and the energy needs of living systems. Plant growth can be monitored and the effects of different variables on that growth can be recorded. Conclusions and/or decisions can be made from the data and visual representations, such as graphing, can often allow a more clear understanding of the data.

Materials:

"…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?
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?

Using _____ I plan on having my students…
(software / modeling package(s)

I will ask the students how many of them have had prior experience with the TI-84 Calculator and then of those how many feel somewhat confident using it. That may identify some students who could become "helpers" to other students as we progress through the lesson.

By asking the question, "How many students here like to eat?", and receiving a probable unanimous positive response, I would then pose the situation of, "How do farmers know what crops to grow to provide us with that food?" There are many different variables that could be tested to help identify a farmer's choice of crop; soil type, amount of rainfall, amount of sunlight, length of growing season, average temperature, etc., but for our purposes, let's just look at the growth rate of different seed types.

A little background about how seed companies would test different seeds to become acquainted with the characteristics of the different seeds, fruit production and other qualities would be shared and then on to the lab set-up. Students would be grouped in pairs.

Choices of seeds available with different varieties might include grasses, beans, corn, peas, radish, carrots. The seeds available in the classroom would be explained and each student group would be asked to take 3 seeds of each of the 2 varieties for their plant type, (i.e. 3 isicle radish seeds and 3 cherry radish seeds) The 3 seeds are just to insure that at least one of the seeds will germinate.

Next, I would ask the students what these seeds will need in order to grow and then pose the question, to test the growth rate, what variables should we keep constant. (sun and water would be kept constant)

Students would plant the seeds in peat pots or a consistant soil mix, 3 seeds together (and remove the others that germinate to leave only one plant), label their seeds with their initials, class and date and type of seed. Place them in trays and provide the water and sunlight.

Each day they would measure and record the growth on their worksheet.

After three weeks of data collection, we would review graphing, what graphing is, why graphing is helpful and the procedure for graphing. We would construct a paper graph of the data we had collected.

Next we would take that same data and enter it into the TI-84 Calculator. With students in their experiment pairs, as a class, I would take them through step by step to enter the data, explaining how to turn the calculator on, where the 2^{nd} function key is and what that means, and where the stat key is. When we hit the stat key twice, then enter, we can enter our data into the L1and L2, columns. When the data is all entered, we would hit stat plot and set up the parameters. (I would either have overheads of the calculator up on the screen, or, if we have access, I would project this on the screen from the computer). In "window" we would review how/why you choose the values for their individual data and then hit "graph" and "Zoom 9" to show the data.

The students who are proficient on the calculator could move around the room to assist those who are having trouble. Some students could come up to the front of the room to demonstrate how their data looks.

To evaluate the lesson, I would provide some data for them and see if they could plot it in a graph. I would walk around the room and check their calculators to see if their graph came out similar to the one I had done. I would probably give them a grade for effort and a grade for mastery and then average the two together. (i.e. "A", "C", "F" for effort and the same for mastery. That way a student that tried hard but got nothing would still not fail the activity, since using the calculator is not required for the course.)

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 is 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 what 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…