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.

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Grade level(s)/Subject taught: Earth Science (9), Living Environment (10), Envirothon Team (9-12)
Objectives: Students will use GIS data from Cornell's Digital Earth to draw conclusions about the relationship between the locations of Earthquakes, Volcanoes and Plate Boundaries.

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).

Volcanoes and Earthquakes are found is specific zones on the earth's surface. These zones are in known locations located on plate boundaries.

Materials: Computer lab (address: www.atlas.geo.cornell.edu/webmap), map handout, page 5 Earth Science Reference Tables

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 _____GIS (Cornell's Digital Earth)_____ I plan on having my students…
(software / modeling package(s))

This is a lab activity that will take place in the computer lab. At the beginning of class students will be asked if they know about a place that frequently experiences earthquakes. I don't think that anybody will have difficulty coming up with California. The discussion will shift to what earthquakes are and within 5 minutes of the start of class I will have students going to www.atlas.geo.cornell.edu/webmap and begin to follow the directions on the handout which will direct them through the activity.

Students will first click on "Show Data Sets" which will bring up a menu of layers that can be added to the picture. Students will click on geography and double click on coastlines then should click submit request. This will create two layers of a map one showing the oceans, the other showing the coastlines. The map will come up and hopefully students will have something that resembles a world map. Student are to call me over once they have gotten to this points so that I can give them the map as long as they have successfully navigated to this point.

Students will then click on geology and have volcanoes added to the list of layers to add to the map. They will submit the request again and the map will now be plastered with volcano locations which they will do their best to plot on their maps they have been given with red pens.

Students will then click on geophysics and choose to have Seismicity (CMT) added as a layer on their maps. Students will use a blue pencil to mark the areas that experience frequent earthquakes on their maps. Students will need to answer the following question: How do the locations of earthquakes compare with the locations of volcanoes? I will be wandering around the computer lab to check if students are correctly concluding that earthquakes and volcanoes are found in similar locations.

Students will deselect volcanoes and seismicity and add plate tectonic boundaries onto the map. Students will be asked to make a conclusion regarding the locations of volcanoes and earthquakes compared to plate tectonic boundaries. Once again students should be concluding that they are all happening in the same locations. Coincidence??? I think not.

Finally, students will need to take choose IDC seismicity (by depth) from the geophysics selection. Students should know that the following color scheme is as follows
RED – Shallow focus Earthquakes
PINK – Shallow to slightly deep Earthquakes
GREEN – Medium depth focus
YELLOW – Medium to deep focus
PURPLE – Deep focus earthquakes

Using the mouse click and drag to highlight different regions on the map where there is a lot of earthquake activity. Have student compare the type of plate boundaries with the earthquake depths. Have the students try to answer questions such as …
Do you see any patterns between the depths of earthquakes and the different kinds of plate boundaries.
(Students will need to compare locations with plate boundaries identified in their earth science reference tables).
How does the depth of earthquakes at mid ocean ridges compare to depths of earthquakes at subduction zones.
Check out 3 different locations where plates are subducting…do they show any similar recordings of earthquake depth?
What do you think causes the different earthquake depths along this plate boundary?

I think that it is really important to be able to use this tool to help teach students about science through discovery

and this being the learning process I don't know how I would assess them other than to encourage and guide their discovery. It would not be a fair assessment to have them create a map because click click and it is done. However, to build knowledge from their discoveries is priceless and a far greater achievement. No rubric has been designed because of the nature of the activity.

**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…