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Using GIS/GPS To Determine Where Volcanoes And Earthquakes Are

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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: Erin Gwara
Grade level(s)/Subject taught: Earth Science
Objectives: To determine where volcanoes and earthquakes are in the world, using GIS/GPS software.

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).

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).

Many of the phenomena that we observe on Earth involve interactions among components of air, water, and land.

Materials:
Computers with GIS/GPS Software with internet access
Student handout

"…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 ArcMap (GIS/GPS) I plan on having my students research the locations of fault lines, convergent and divergent boundaries, volcanoes, and earthquakes.** Bellwork for the students would already be placed on the overhead as they walked in, and their bellwork sheets would be on their desks. The question to answer for bellwork would be related to earthquakes,	

volcanoes, and reading the Earth Science Reference Tables. The bellwork question would have the students examine a plate tectonics map in the ESRT and make a prediction about what sorts of landforms would be found at convergent and divergent plate boundaries.

After the students had about 3-4 minutes to work on the question, bellwork sheets would be handed in and I would go over the answers with the students.

There will be a journal entry sheet at each student's desk, which explains the day's activities and what is needed for them to do. We are assuming that the students have had previous experience with ArcMap and are knowledgeable with basic tasks used in the program.

The first concept students need to know about convergent and divergent boundaries is the idea of convection cells in the Earth's surface. Students will go to the website http://www.edumedia.fr/a399_l2-mantle-convection.html to see an animation about convection cells. They will use the website to explore and answer the journal entry questions.

After exploring the convection cell website, students will then open up ArcMap and layer three GIS maps out—a map of the world showing plates of the crust, and divergent or convergent boundaries, a map showing where active volcanoes are, and a map showing where earthquakes are. By using all three maps, they will be able to answer and interpret several questions relating to the Earth's crust and the types of features that are made at particular plate boundaries.

I will circulate the room for understanding, asking students to explain what they are seeing on the website and on ArcMap. Assessment will be informal, as done by asking students questions, and formal, as by reading their journal entries and answers to the proposed questions.

Three	Two	One
• Student answers all questions in journal • Student correctly draws convection cells and crustal plate movement • Student correctly answers 12 to 15 questions	• Student is missing 2-5 questions in journal • Student correctly draws convection cells but incorrectly draws crustal plate movement • Student correctly answers 9 to 12 questions	• Student is missing 5 or more questions in journal • Student does not draw convection cells or crustal plate movement • Student correctly answers less than 9 questions

Journal Entry #48—Using the Earth's Crust/Convection Cells

In your journal…

Job 1: Plate Movement

- Go to the website http://www.edumedia.fr/a399_l2-mantle-convection.html
- Draw a series of convection cells.
- On top of the convection cells, draw crustal plates.
- Show the movement of the crustal plates by drawing arrows in the plates.
- Label the movement: divergent or convergent.

Job 2: Using the Earth's crust

- Open ArcMap.
- Layer the following GIS/GPS maps…Earth's crust and plates, active volcanoes, and earthquakes.
- Look over the map and your Earth Science Reference Tables.
- Name the four types of boundaries.
- Examine the location of volcanoes and the location of earthquakes.
- Compare the location of volcanoes to the location of earthquakes.
- Compare the location of volcanoes and earthquakes to the location of plate boundaries.

Use the ESRT to

- Identify and name the feature found at spreading centers.
- List three examples of this feature.
- Identify and name the feature found at subduction zones.
- List three examples of this feature.
- Find and name a transform fault.