# Introduction to Google Earth

Assignment developed by:

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NASC130 – Principles of Geology Bentley College Fall 2007 – Spring 2008

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The following pages include information for instructors and the original assignment.

Please adapt this assignment as appropriate for your needs, provided you attribute this activity to Liane M. Stevens. Please see the following sources for more information:

http://serc.carleton.edu/NAGTWorkshops/policy.html http://creativecommons.org/licenses/by-nc-sa/1.0/

### For Instructors:

# Introduction to Google Earth created by Liane M. Stevens

Activity Description: This assignment is a geologically-oriented Google Earth tutorial that is used in preparation for a course project in which students create Google Earth content summarizing the geology of features of interest on campus. This tutorial addresses navigation, layers and featured content, and creation and modification of Placemarks, Paths, and Polygons. Students are expected to be proficient in the use of Google Earth at the completion of the tutorial. Proficiency with Google Earth allows students to complete geologically advanced projects that require, or benefit from, geographic display of information. Further, non-science majors are introduced to the exploration of Earth using this fascinating application, and are able to find applications for the program in their daily lives.

Activity Benefits: This assignment is designed as an introductory Google Earth tutorial on navigation; layers and featured content; and the creation and modification of Placemarks, Paths, and Polygons. The assignment is intended as a stepping stone to more advanced geologic projects that require use of Google Earth. Future geologic projects are without limit - description of geologic features of interest, simple spatial analysis of data (e.g. water quality at the campus pond), student-created content in a virtual field trip, etc.

Assignment Context: This assignment is part of a 3-4 part course project for the non-science majors in an introductory physical geology course at Bentley, a (primarily) undergraduate business college. There are no geology majors at Bentley; few students elect a broad liberal studies major in "Earth, Environment & Global Sustainability."

The course project requires students to investigate and describe a geologic feature on campus, and then to create a Google Earth placemark (text and photographs) for their feature. Students work in pairs to complete this work. Additional project assignments include: a campus field trip to learn field methods and observations; initial investigation; detailed observation; creating a written summary; and creating Google Farth content.

<u>Required Skills</u>: Students complete this assignment near the beginning of a course on physical geology. Little previous geologic knowledge is required, despite the framing of tutorial questions within a geosciences perspective. Students are expected to complete basic textbook/internet research to answer some questions.

Activity Goals: The goal of this activity is to develop a working understanding and skills relating to the use of the Google Earth application; these skills will be applied to future geologic projects requiring the successful utilization of Google Earth.

# References & Resources:

- Abstract: Stevens, Liane M., 2008, Enhanced Reality: Linking the campus field trip and the virtual field trip in an inquiry-based Google Earth project for non-science majors: Geological Society of America Abstracts with Programs, Northeastern Section, March 2008, Buffalo, New York.
- Google Earth: http://earth.google.com/

Activity Evaluation: Students submit a Word document with answers to geologic and Google Earthbased questions. Students must also submit a Google Earth file (.kml, .kmz), with the required content, proving their ability to use the content and tools in Google Earth. This assignment is assessed by marking written answers and the creation of Google Earth content.

# Additional Notes for Instructors:

Assignment instructions are denoted with a bullet point (§). Written questions or specific instructions for the creation of Google Earth content are numbered.

Instructions apply to Google Earth 4.2, not to the recent (April/May 2008) Google Earth 4.3. Google Earth-specific instructions may need to be updated. For example, the button on the Google Earth website for downloading the program is now blue rather than green, as is noted in the assignment.

The details of this assignment are easily adapted to suit your preferences. For example, I ask students to load the USGS Earthquake KML feed and to search for earthquakes in New England; give your location, you may prefer different instructions. As such, answer keys will vary based on your location, preferences, etc.

Further, as I have included my current assignment in its totality, there are details (dates, email addresses, etc.) that require updating with your personal information.

I have been surprised that very few of my students have actually used Google Earth prior to this assignment. Most students have enjoyed learning to use this application. Only a few students have found the "technology" overwhelming. Students may need to be reminded to follow instructions carefully! None have experienced technical difficulties during the use of the Google Earth program. Students appear to benefit from completing this assignment with a partner.

Name:

# Applied Geology Homework #2

**Assignment**: The second part of this Applied Geology assignment is to get acquainted with your assigned working partner and to become familiar with Google Earth. You and your partner must work together to complete this assignment. Any written answers should be in a Word document. See the guidelines for completion at the end of this assignment. This assignment is due at the beginning of class on Tuesday, April 1, 2008.

#### Getting Started with Google Earth\*:

Follow the instructions below, and answer questions as requested. \*Note: While working with Google Earth you will most likely want a direct internet connection (not wireless) for the best access and speed.

Download the latest version of Google Earth to your laptop:

- Go to the Google Earth website at: <a href="http://earth.google.com/">http://earth.google.com/</a>
- Click the large green button ("Download Google Earth Free") at the top right corner of the website.
- Follow the instructions and prompts to load the software to your laptop.
- If you have trouble downloading the software, please work with your partner to try to figure it out first before contacting me. The whole process shouldn't take more than five minutes to complete!

Get acquainted with the Google Earth software:

- Whether you are new to Google Earth or are just downloading the latest version, get a brief overview at: <a href="http://earth.google.com/earth4.html">http://earth.google.com/earth4.html</a>
- (\$) Start up the Google Earth program, and follow the instructions below...

#### **Navigating Google Earth.**

Note the control panel in the upper right corner of your screen... it appears when you move your cursor over the window. Use this control panel to zoom in and out (right), tilt up and down (top), and otherwise navigate (arrows, ring). Note that you can also zoom in and out using a mouse with a scroll wheel. Practice playing with these controls!



#### **Layers and Featured Content.**

Note the panels on the left side of the screen (Search, Places, Layers). You can search Google Earth in the **Search** panel, just as you would conduct searches using any other online mapping software. The **Places** panel is where you can store your own files and folders, and where you can save downloads. Finally, the **Layers** panel allows you to turn on and off other features, such as place names, roads, boundaries, and featured content.

- Note that there are a lot of icons shown when you zoom in for a closer look at Earth's surface. Each of these icons represents "featured content" see this folder in the Layers panel.
- Click once in the box beside the Gallery folder in the Layers panel. This will remove all (or most) of the icons (as needed).
- Click the + symbol next to the Gallery folder to open this folder, then check the box next to "Gigapxl Photos."

- Find the Gigapxl photo at Mount St. Helens National Volcanic Monument in Washington State. Double click on the icon. A description will open automatically. Click to "fly into the ultrahigh resolution photo."
- Note that you can zoom into, out of, and around this photo.
- 1. Note the large crater in the side of Mount St. Helens. How and when did this crater form?
- 2. Zoom into the center of the photo, and note the "matchstick-like" pattern on the side of the green hill. What are the long, whitish objects, and what caused this pattern?
  - When you are done looking at the Gigapxl Photos, exit the photo and turn the Gigapxl layer off (uncheck the box). Zoom out until you can see the summit of Mount St. Helens.
  - Try clicking the "Terrain" layer in the Layers panel on and off. Ultimately, you want the Terrain layer to be on.
- 3. How does the Terrain layer change what you see at Mount St. Helens?
  - (\$) Use the control panel in the upper right of the screen so that you are facing directly into the crater.
- 4. What direction are you facing?
  - Click the "N" on the control panel ring. This will reorient the map such that North is "up."

#### Saving Your Own Content.

- Click on the "Add" menu at the top of the Google Earth window, and add a folder. Name this folder with your last names in alphabetical order. E.g. If Anna Tary and Liane Stevens are working together on this project, the folder would be called "StevensTary." Once added, you will see the folder in your Places panel. Be sure that your folder is inside the "My Places" folder and NOT inside the "Temporary" folder simply drag and drop to rearrange the folders.
- Click on the Tack icon at the top of the window (or Add → Placemark) to add a **Placemark** to your folder. Name the placemark "Mount St. Helens." Do NOT yet close the Placemark window! Position the placemark (by dragging) so that it is in the center of the dome inside the crater of the volcano. Give the placemark the following description: "Dome inside crater." Click on the yellow tack in the pop-up window, and choose the volcano icon for your placemark. Click OK.
- Note that your new placemark has appeared inside your folder in the Places panel. (If not, drag and drop until it does.)
- Right-click on the placemark you just created and select "Properties." This is how you can edit a placemark.
- 5. What is the latitude and longitude of your placemark? You may close the placemark window when you have answered this question.
  - Find Bentley College, either by searching or by using the control panel to "fly" to it.
  - Add a placemark in the center of the Greenspace behind Collins. Give the placemark a name, description, and an interesting icon. Be sure the placemark appears inside your folder in the Places panel. If not, move it by dragging and dropping.
  - ⑤ Let's add a Path showing the most likely route from your icon on the Greenspace to your Geology class in Jennison. Click on the Path icon at the top of the window (or Add → Path). Give the path a name and a description. To create the path, click at your starting point and then drag along the desired route to your ending point. When finished, choose a bright color for your path so it shows up clearly.

- Each partner should choose a building or dorm on campus. You'll use the polygon tool to show where this building is located. Click the Polygon icon at the top of the window (or Add → Polygon). Give each polygon names and brief descriptions. Create the polygon by clicking at each corner of the building. Be sure to close the polygon by connecting the first point to the last point. Now, in the Properties window for the polygon, give the polygon one area color and a different line color. Make the area opacity 50%. Under the "Altitude" Tab, give the polygon an altitude of 30 meters, and extend the sides to the ground (click box). Use the navigation control panel to tilt the view to show the 3D view of the polygon. In the Properties box for the polygon, click on "Snapshot View." This means that whenever someone clicks on your polygon, they will be shown the same view that you have just designated.
- Click on the "Tools" menu at the top of the Google Earth window, and select Ruler.
- 6. What is the distance, in <u>feet</u>, from the center peak of Baker Library to the fountain in the campus pond?
- 7. Is this satellite image of Bentley College current (showing what the campus looks like now)? How do you know? Give at least two lines of reasoning.
  - § Each team member should locate his or her hometown. It is not necessary (unless you want to), to mark precisely where you live. Save these locations as placemarks. Give each placemark a name, description, and interesting icon.
- 8. What is the distance, in kilometers, between your hometowns?

#### Importing KML (Google Earth) Content.

- Go to the website for the USGS Earthquake Hazards Program at: <a href="http://earthquake.usgs.gov/">http://earthquake.usgs.gov/</a>.
- Find the link on the left side of the screen for the Google Earth KML. When you click on this link, the .kml file will automatically load and open in your Google Earth program.
- Note that beside the locations and magnitudes of current/recent earthquakes, this file contains a number of layers, including various tectonic boundaries. Look through the folders and try turning on and off the different layers.
- In the Layers panel, find and turn on the Borders and Labels layer.
- 9. How many earthquakes have occurred within New England (MA, CT, RI, NH, VT, ME) in the last week?
- 10. In which U.S. state (lower 48) have the most earthquakes occurred this week? Why are earthquakes so common here?
  - Choose any recent earthquake of interest to you. Add a placemark at the epicenter (location at Earth's surface) of this earthquake. Give the placemark a name. In the description of the placemark, note the date and magnitude of the earthquake. Finally, give the placemark an interesting/appropriate icon.

#### Finishing HW#2.

#### Guidelines:

Note: Each team <u>must</u> work together, but you may choose how to <u>best</u> complete this assignment. If you are Google Earth novices, you will wish to work together on the same computer; however, each of you should download Google Earth to your own laptops. If you are comfortable with this assignment, you may choose to email .kmz files back and forth to each other until you have a final product.

- Format: Type your responses (1.5 line spacing) in a Word document. Be sure to number your answers! Do not include the original assignment just your answers. Check your spelling and grammar.
- Research: You may use your textbook, course handouts, and the websites listed on Blackboard to complete this assignment. Use <u>endnote references</u> for any sources other than your textbook, course handouts, or Google Earth content (ask questions or see handout on Blackboard).
- This assignment is due by the beginning of class on <u>Tuesday</u>, <u>April 1</u>, 2008. You may turn the assignment in before this time, if you wish. You <u>must</u> submit this assignment as emails/attachments to <u>lstevens@bentley.edu</u> NO hard copies, please!

#### Instructions for Submission:

- Be sure that all of the placemarks, etc. created for this assignment are in your folder (e.g. Stevens Tary). Right-click on your folder in the Places panel, and choose Email. The Google Earth program will save this folder as a .kmz file. This is the zipped version of the standard .kml Google Earth file type.
- Attach the Word document with your written answers to the above questions to the same email created in the previous step.
- The completed assignment includes <u>one</u> email sent to <u>lstevens@bentley.edu</u> with the following items attached:
  - Google Earth .kmz file
  - Word document with typed answers