

Name \_\_\_\_\_

**Lab 1: Introduction to Google Earth (v.5)  
By Professor Denise Bristol, Hillsborough Community College**

**Instructions:**

For this lab, you will need to record your answers in a separate word document. Do NOT copy the questions into this word document or your lab will not be graded. You should include your name on the first line of the document and the second line should read: **Lab 1 Introduction to google earth.** Each of your answers must be numbered according to the question in this document. Each answer must be on a different line. You may wish to separate your answers with a header for each exercise, for example.

Exercise 1

1. Your answer to question 1
2. Your answer to question 2

So on and so forth with the numbering until exercise 2....

You will upload your word document to Canvas under the assignment. Remember that the file name should be **your Lastnamefirstname\_Lab1.docx**.

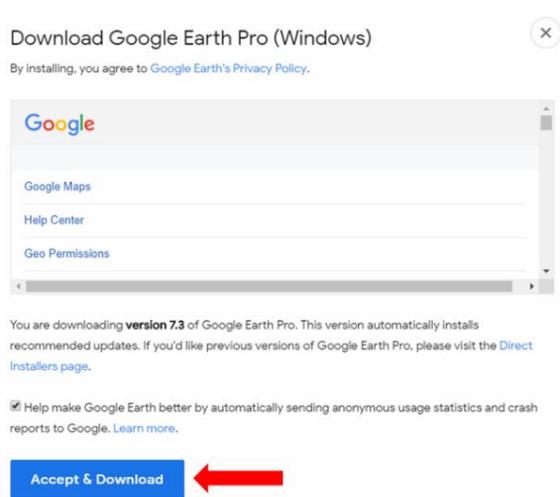
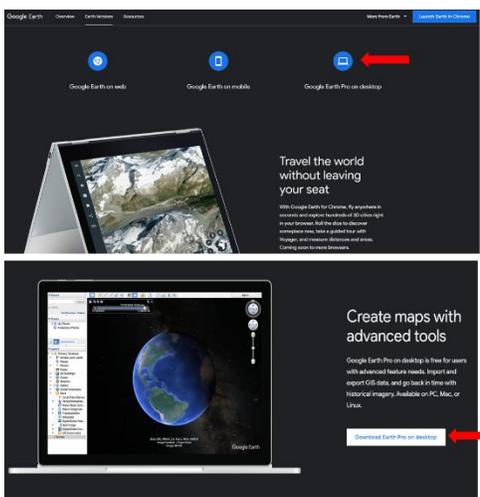
Make sure to double check your answers are numbered correctly for each question or they will be incorrect.

Please note that exact answer to other students is considered copying or cheating and will result in a grade of zero for the lab. Make sure that you do your own work and your answers are in your own words.

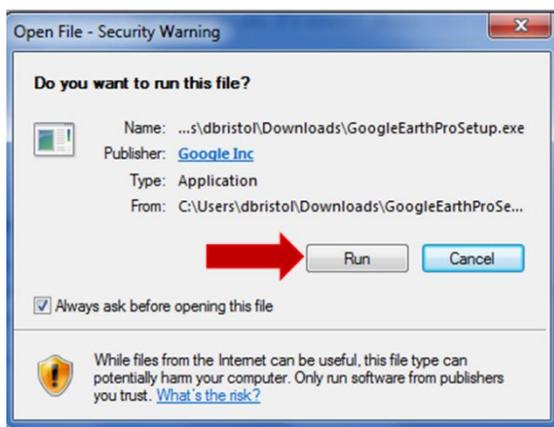
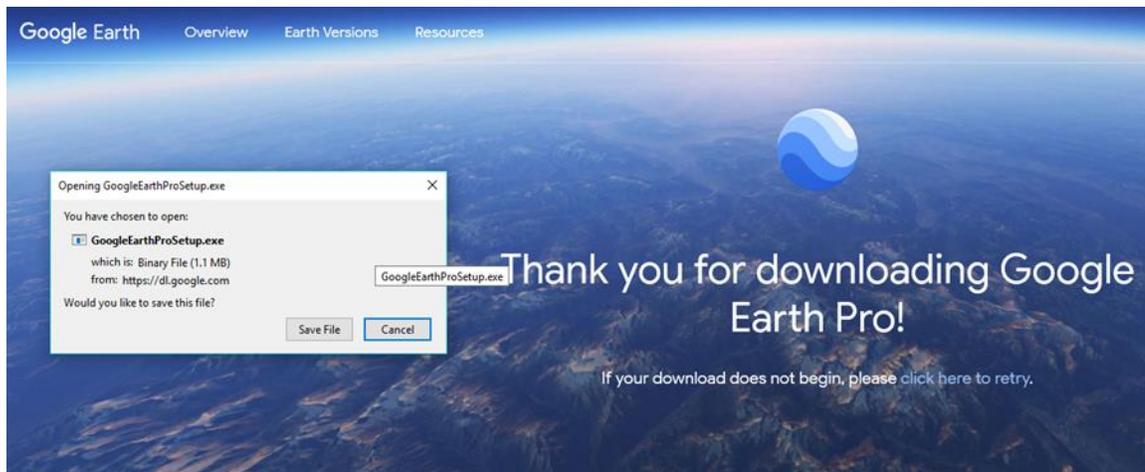
**Part A: Preparing for the Lab:**

**Download google earth to your computer if you do not already have it.**

Go to: <https://www.google.com/earth/versions/> and select Google Earth Pro on desktop, then agree to their terms of service and download the program. **DO NOT use the web or mobile version, ask the files for this activity will not work properly!**



Save the program to your computer. Once the file is saved, select the .exe program file and follow installation instructions.

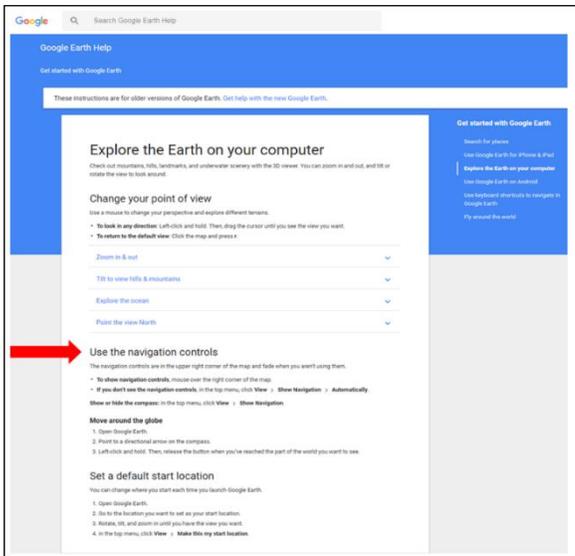


Go to: <https://support.google.com/earth/answer/21955?hl=en> for help downloading the program.

**Note:** For the current time we are using the original version of Google Earth Pro, not "New Google Earth". This is because New Google Earth is limited in the platform and features. New Google Earth is web-based and can only be used in Google chrome; it also does not yet support all of the features needed for many GEODE exercises.

## B. Google Earth Tutorials:

1. Go to: <https://support.google.com/earth/answer/148186?hl=en> to familiarize yourself with basic navigation in Google Earth and <https://support.google.com/earth/answer/148134?hl=en> for a tutorial on measuring distance and elevation and
  - a. Navigation includes tools for:
    - Changing your point of view
    - Using the navigation controls
  - b. Drawing and Measuring includes tools for:
    - Drawing Paths and Polygons
    - Measuring Distances and Area
    - Viewing Elevation Profiles



### Use the navigation controls

The navigation controls are in the upper right corner of the map and fade when you aren't using them.

- **To show navigation controls**, mouse over the right corner of the map.
  - **If you don't see the navigation controls**, in the top menu, click **View > Show Navigation > Automatically**.
- Show or hide the compass:** In the top menu, click **View > Show Navigation**.

### Move around the globe

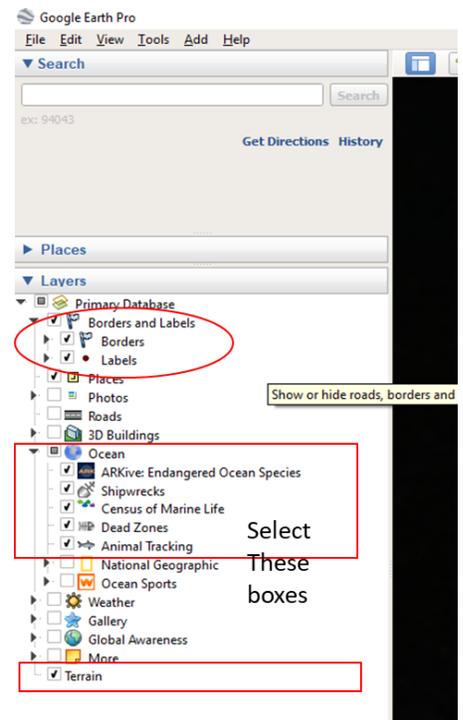
1. Open Google Earth.
2. Point to a directional arrow on the compass.
3. Left-click and hold. Then, release the button when you've reached the part of the world you want to see.

### Google Earth Layers:

1. Open Google Earth Program
2. Turn on your ocean layers by selecting "Ocean" under the Layers menu on the left side of your screen.
3. Turn off all other layers by deselecting all other boxes except
  - a. "geographic features" under "borders and labels" and
  - b. "Borders" (all)
  - c. Terrain

### Downloading files for Layers in Google Earth

- Once you have downloaded google earth, please download the file PangeaBreakup.KMZ from your canvas course under the lab module or from <https://serc.carleton.edu/geode/activities/217454.html>
- Once downloaded, select to open it in google earth.



Fall Term 2017

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#### Introductions to Google Earth

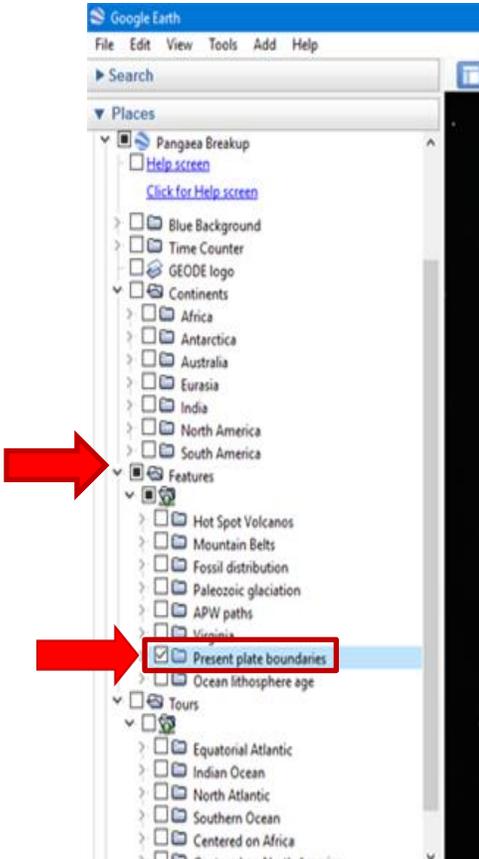
Please go to [Google Earth](#) and download the program.

Download and print the following lab file: [Google Earth Lab.pdf](#)

Once you have downloaded and installed google earth, then download the following file and save it to your computer: [PangeaBreakup.kml](#)

You will then need to open it - select "open with google earth" if prompted.

- It will show up in the left toolbar under “Places/Temporary Places”.
  - (You have the option of saving your temporary places when you close Google Earth).



- For now, Turn off all of the Pangea Layers by de-selecting them if they are selected. You will turn these layers back on for Exercise 5 in this lab.

- Keep only the following layer on by checking the box next to it: “Present Plate Boundaries” under features.

**f. Hide the Tour Guide:**

- Open Google Earth
- Click on the black frame immediately above the pictures of tour locations to hide the Tour Guide. (Do not click on the pictures of the tour locations or it will take you to those locations.)



### Pangaea Breakup

Pangaea Breakup - A learning resource for students. Designed, programmed, and tested by Steven Whitmeyer, Mladen Dordevic, Tyler Hansen, and Bill Swanger.

Download the Pangaea Breakup KML file to run the animation in Google Earth

Click here to download an introductory Plate Tectonics exercise for a Physical Geology class (PDF)

Click here to download an advanced exercise on plate movement based on data from Hot Spot volcanoes (PDF)

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Lab Activity

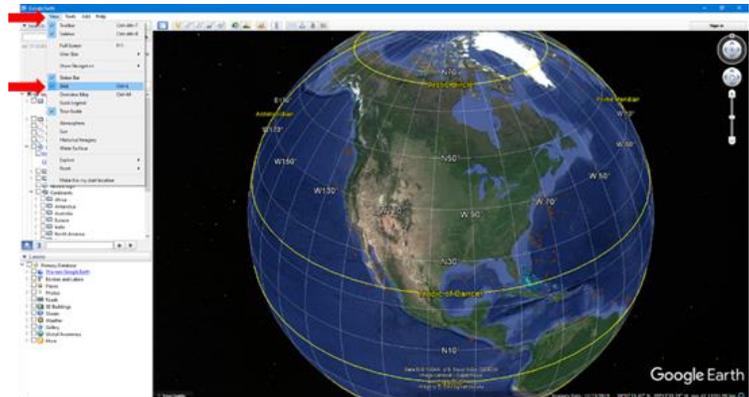
Name \_\_\_\_\_

Each question is worth 1 point unless otherwise noted.

**Exercise 1: Latitude and Longitude**

Turn on the latitude and longitude grid.  
 Go to "View" from the top menu and select "grid".  
 Look at the very bottom of your screen. The Latitude, Longitude and elevation are provided. Negative elevation is depth below sea level.

Go to "Tools" from the top menu and select "options" and look at the 3D tab to check the "degrees, minutes seconds" option for Lat/long NOT decimal degrees.



1. Locate 0° Longitude. What is the name of this line? \_\_\_\_\_
2. Locate 180° Longitude. This line is called the International Date Line or the \_\_\_\_\_.
3. Are the Hawaiian Islands east or west in direction of this line (in #2)? \_\_\_\_\_
4. (2 pts) Search for Mauna Kea and zoom in until you get a red marker. Place your cursor over the center of it. What is the Latitude and Longitude (degrees and minutes only) of Mauna Kea in Hawaii? \_\_\_\_\_
5. (2 points) What is the Latitude and Longitude (degrees and minutes only) of the Loihi seamount? \_\_\_\_\_
6. What is the depth in feet of the seamount given by holding your cursor over the location? \_\_\_\_\_

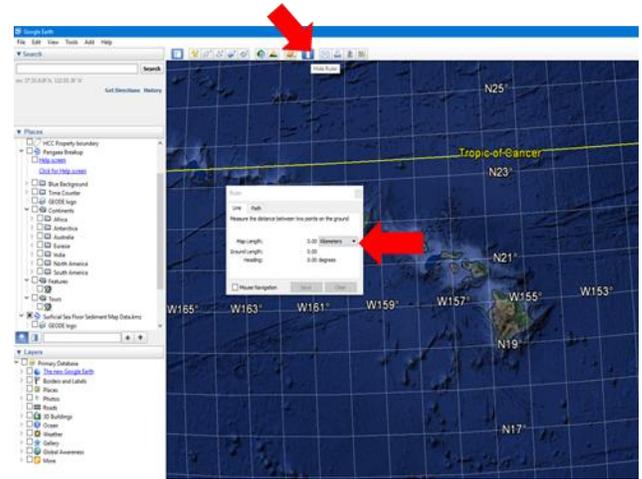
Zoom in and select the circle for the Loihi seamount and watch the video.

**Exercise 2: Measuring Distances**

7. Using the ruler (available along the menu at the top), set the distance units to **Kilometers**. Approximately how far is Mauna Kea from Loihi Seamount? \_\_\_\_\_

To search and find a location in Google Earth, use the Search function in the left menu bar.

8. Search and proceed to the Guam. What major ocean basin trench feature is due east of Guam? \_\_\_\_\_



Now zoom out and head back to Florida!

9. Using the ruler tool, how far from Florida’s east coast (Vero Beach due East) is the Mid Atlantic Ridge? \_\_\_\_\_ km

Zoom all the way in to the bottom of the Mid Atlantic Ridge (Stay to one side or the other of it). Keep zooming until you are looking horizontal. Scan around so that you are looking at the Ridge. (looks like a big mountain in front of you!)

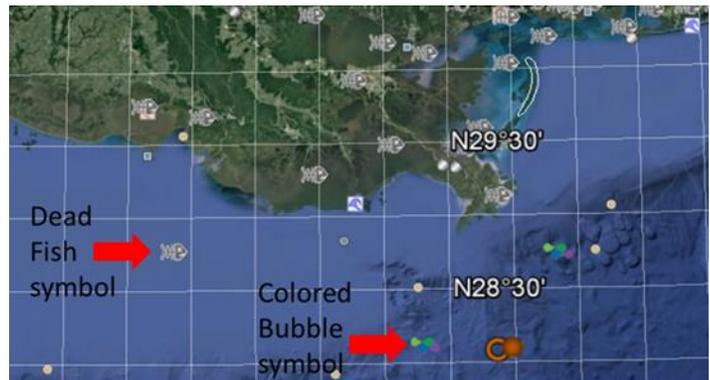
To zoom back out press the Backspace key!

**Exercise 3: Symbols and data**

Now, navigate to the Gulf of Mexico.

10. Click on several of the dead fish symbols. What do these type of links represent? \_\_\_\_\_

11. Click on several of the colored bubble symbols (green/blue/purple). What do these type of links represent? \_\_\_\_\_



**Exercise 4: Evidence of Plate Tectonics**

Now you will need to turn off the “Borders and labels” layers as well as the “Oceans” layers. Turn on the “PangeaBreakup” Layers – all continents and then turn on the “fossils” layer. Zoom in to South America

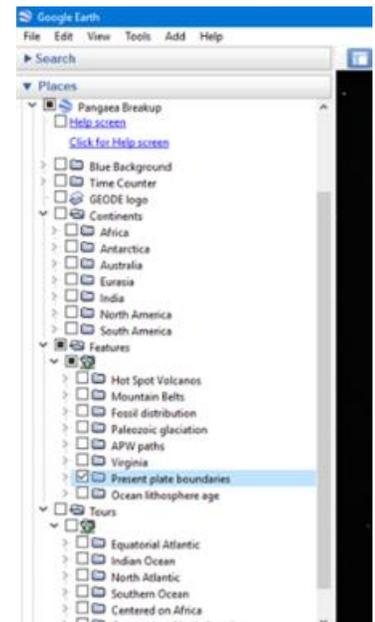
Watch the following NOAA videos and try the activities prior to completing the google earth exercise:  
 Plate Tectonics and global impacts: <http://www.montereyinstitute.org/noaa/lesson01.html>  
 Mid Ocean Rides: <http://www.montereyinstitute.org/noaa/lesson02.html>  
 Subduction zones: <http://www.montereyinstitute.org/noaa/lesson04.html>

**Plate Boundaries** – There are 3 basic types of plate boundaries:

- **Convergent** – When plates come together, one plate will be subducted under the other. This forms features such as mountains, island arc systems, and ocean trenches.
  - Continent – Continent – These often form mountain ranges.
  - Continent- Oceanic – The denser oceanic plate subducts under the less dense continental plate
  - Oceanic-Oceanic – The older and denser oceanic plate will subduct under the younger less dense oceanic plate.
- **Divergent** – When plates move apart it creates spreading centers that show up as sea floor spreading zones in oceanic crust, and rift valleys in continental crust.
- **Transform** – When plates slide past each other. They are very common in oceans where they offset mid-ocean ridge.

Now go back to Google Earth!

- **Make sure that the box next to: “Present Plate Boundaries” under features from Pangea Break-up is checked (but not all of the rest of the layers within Pangea).**



12. What is the main plate boundary type found at the Mid-Atlantic Ridge?  
\_\_\_\_\_
13. What type of boundary is found between the South American Plate and the Nazca Plate? \_\_\_\_\_
14. Zoom in to the state of California along the west coast of the U.S. What type of plate boundary runs through California? \_\_\_\_\_
15. What type of present-day collision formed the Himalayan Mountains at the boundary between the Indian Plate and the Eurasian Plate?  
\_\_\_\_\_

**Exercise 5: Evidence of Plate Tectonics**

Now you will need to:

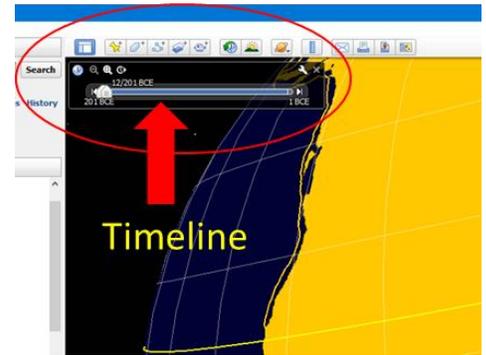
- Turn off the “Borders and labels” layers (deselect box next to these)
- Turn off the “Oceans” layers.
- Turn on the “PangeaBreakup” Layers – all continents (See **Downloading files for Layers in Google Earth** previous in the lab for these layers)
- **Note:** Depending on your internet access speed, be patient as these layers may take a while to load!

16. When Pangaea was still a supercontinent (200 Ma), which present-day continent was located at the North Pole \_\_\_\_\_
17. (3 points) Turn on the “fossils” layer and rotate the earth (East-West and North-South) to observe where the fossils are located. Explain geographically where on earth you find most of the Glossopteris, Mesosaurus and Lystrosaurus? \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

## Oceanography (OCE2001C)

18. (3 points) In the upper left corner in google earth there is a slide bar to view the historic timeline. What happens to these populations (Note: A population is a single species in a defined area) as you move the slide bar toward 1 BCE?

\_\_\_\_\_



19. (3 points) Now, turn on the “Mountain belts” layers and reset Pangea to Historic times. Move the timeline slider toward modern day (1 BCE) and observe what happens with the mountains. Explain how this is evidence of modern day Plate tectonics. \_\_\_\_\_

- Turn off the “Mountain belt” layer, turn on the “Borders and labels” layer again and then turn on the “Present Plate Boundaries” and “Ocean Lithospheric Age” (note, this layer may take a few minutes to load). There is a color key with a timeline.

20. Where are the oldest sediments in the Atlantic ocean found? \_\_\_\_\_

21. Approximately how old are the oldest sediments in the Atlantic according to the key for this layer?

\_\_\_\_\_

22. Where are the youngest sediments in the Atlantic found? \_\_\_\_\_

23. (5 points) Where are the youngest and oldest sediments in the Pacific and how is the age distribution different than those found in the Atlantic Ocean? (Explain using plate boundary types and the movement of plates)

\_\_\_\_\_

Go to the following web page: <http://www.montereyinstitute.org/noaa/lesson01/l1la2.htm> . Review the Tectonic plates and the locations of earth quakes. Study the global distribution and depth of large earthquakes that occurred between 1975 and 1995 shown on the map. Then move the slider bar below the map to compare the locations of earthquakes with plate boundaries.

24. (5 points) Notice that earthquakes are mainly concentrated in narrow bands. Explain why the earthquakes occur in these locations and how it is evidence for plate tectonics.

\_\_\_\_\_

\_\_\_\_\_

### Exercise 6: Just for Fun! (Bonus!)

- Go Back to Google Earth. Turn off all the Pangea layers and turn on the “roads” layer and “oceans” layer

25. Type in the address of your Campus and look for the campus. What is the elevation of your campus science building? \_\_\_\_\_ Feet.

26. Zoom in to street view. Can you see the campus from street view? \_\_\_\_\_

### Post lab instructions:

Turn off all Pangea layers but save the files to your temporary places as you close google earth.

Explore some of the interesting icons, videos and data for the Gulf of Mexico and the Caribbean so that you get used to using google earth.

You will be using Google Earth in subsequent lab activities for this course. In the next lab you will be exploring marine sediment distribution.

### Resources:

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Exercise 4 and 5 are adapted from the following:

**Pangaea Breakup** - A learning resource for students; Designed, programmed, and tested by Steven Whitmeyer, Mladen Dordevic, Tyler Hansen, and Bill Swanger available from: <https://serc.carleton.edu/geode/activities/217454.html> . This is part of the GEODE Project funded by NSF DUE 1323468 and a Google Curriculum award to JMU.