

Name _____

HOMEWORK #2 – Earth Concepts

Due Friday, April 21st IN CLASS

Answers to the questions must be given in complete sentences (except where indicated), using correct grammar and spelling. Please be as brief and to-the-point as possible (*more is not necessarily better*).

You are encouraged to explore the web for help but **DO NOT COPY DIRECTLY FROM WEBSITES**. Links posted on the course website may be particularly helpful in answering some of the homework questions.

Homework assignments must be legible. Handwritten or typed responses are permitted. Make sure that your assignment is stapled!

Grading Summary:

Questions 1: 15 points

Question 2: 12 points


Question 3: 45 points

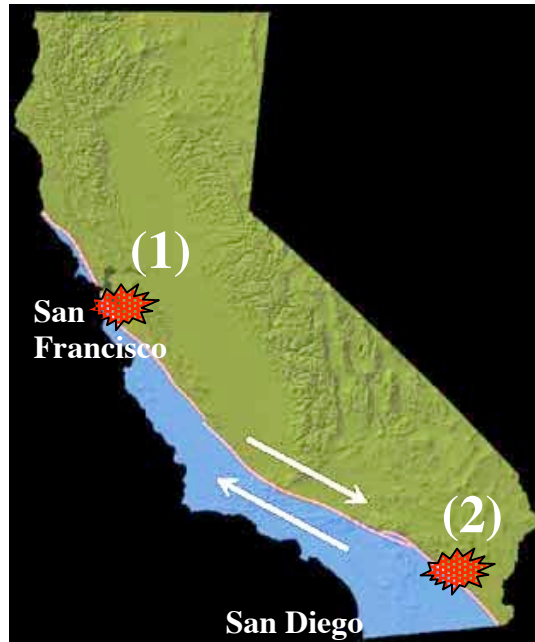
Question 4: 12 points

Question 5: 16 points

Total: 100 Points

1. California Plates & Quakes

Suppose 2 large earthquakes of magnitude 7.0 occurred in California within a few days of each other, represented in the map below by . The first earthquake occurred in Northern California (1) and the second earthquake occurred in Southern California (2). Both earthquakes lasted approximately 30 seconds. Given this information, answer the following questions.



- 1.1) On the map above, a line is drawn through California showing a major fault that represents the boundary between two major tectonic plates. What is the name of this fault?
- 1.2) What is the name of the tectonic plate on the northeast (right) side of this fault?
- 1.3) What is the name of the tectonic plate on the southwest (left) side of this fault?
- 1.4) Given the locations of the earthquakes, residents of which city (San Francisco or San Diego) will likely experience the strongest shaking? Why?
- 1.5) Name two factors that engineers & city planners in both cities should consider before attempting to build major freeways and structures.

2. Earth's Magnetic Field

The Earth has a magnetic field, which you can verify by observing a compass needle swing to point in a specific direction that we call "North". Its existence has been known for thousands of years, which supports the suggestion that geomagnetism, the study of the Earth's magnetic field, is one of the oldest topics of study in earth science. The geomagnetic field is still the subject of intense study by geophysicists and geologists today because it can provide clues about conditions deep in the interior of the Earth, as well as about the history of the planet.

2.1) Today, a compass needle points in the North direction. Throughout Earth's history, would the needle have always pointed in the same direction?

2.2) What scientific evidence do we have of this and where is it found?

2.3) What part of the Earth is responsible for generating the magnetic field?

2.4) Besides the fact that Earth's magnetic field provides improved navigation (through the use of a compass), name another benefit of the magnetic field (hint: think about global protection).

3. Where in the World?

Examine the images (below) containing major plate boundary features and then answer the following questions asking you to identify the object in the image and locate where it is in the world. A global topography map may be helpful (you can find one linked to the course website).

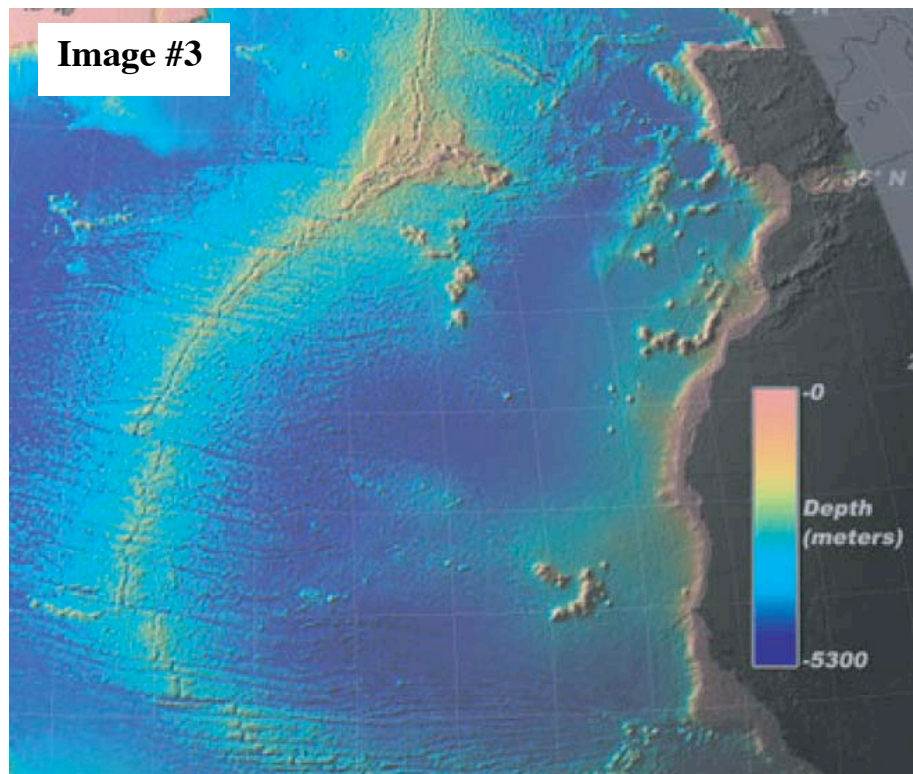
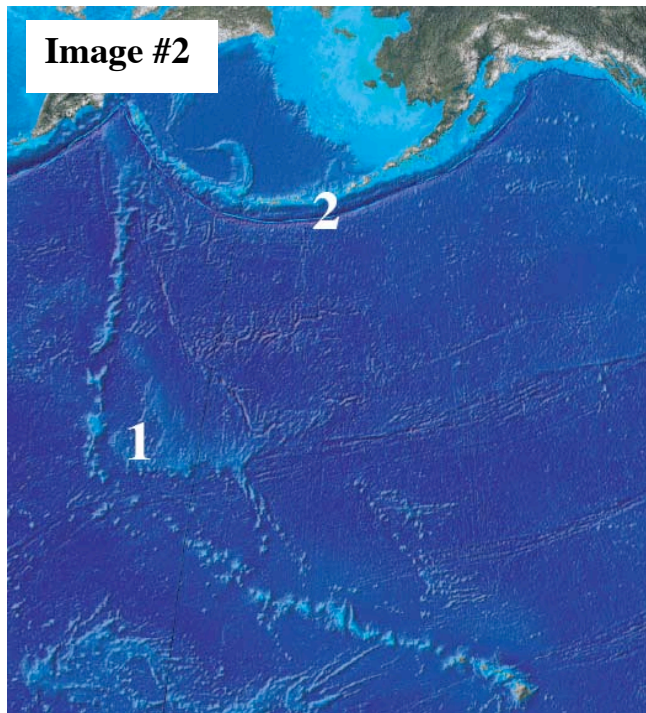
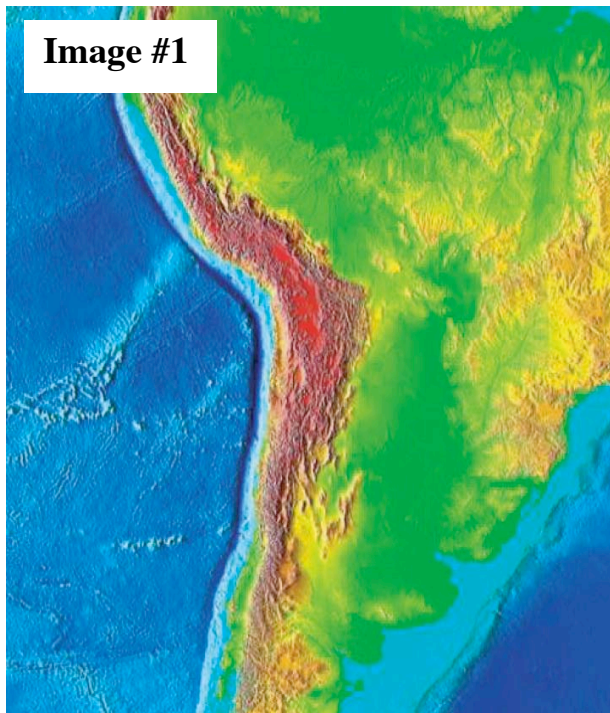


Image #4

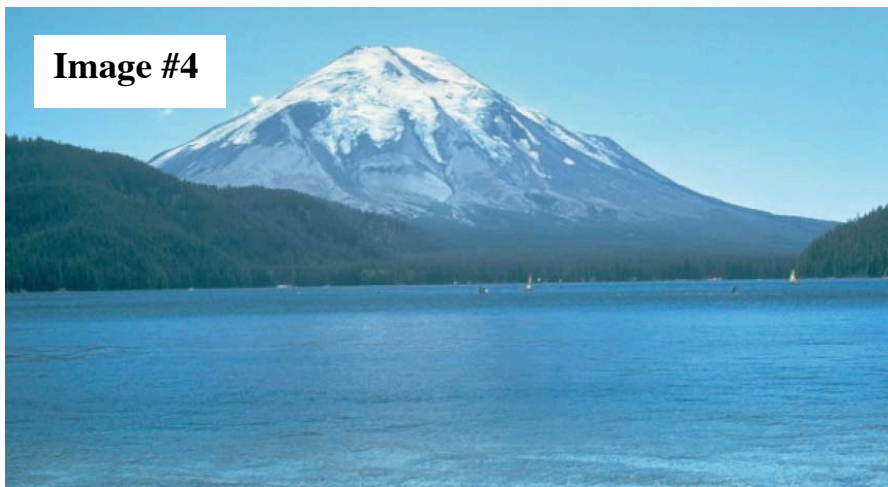


Image #5



Name _____

3.1) Identify the type of plate boundary (divergent, convergent, transform) in **Image #1**.

3.2) List two observations (features) that support your answer for Question 3.1.

3.3) Where in the world (continent or major ocean) is **Image #1**?

3.4) Image #2 is labeled with two plate boundaries and/or features related to plate tectonics. Identify each of these:

1.

2.

3.5) Where in the world is **Image #2**?

3.6) Identify the type of plate boundary (divergent, convergent, transform) in **Image #3**.

3.7) List one observation that supports your answer for Question 3.6.

Name _____

3.8) Where in the world is (continent or major ocean) **Image #3**?

3.9) Image #4 is comprised of a before and an after snapshot of a volcano. Of the two types that we discussed in class, what type of volcano is this? Give one observation to support your answer.

3.10) The volcano in **Image #4** is located in the western United States and erupted suddenly in 1980. What is the name of this volcano?

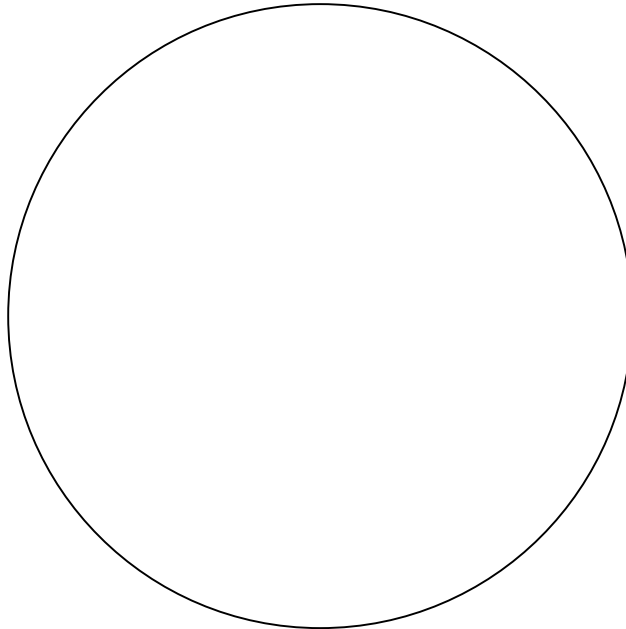
3.11) Identify the type of plate boundary (divergent, convergent, transform) related to this volcano.

3.12) Identify the type of plate boundary (divergent, convergent, transform) in **Image #5**.

3.13) Image #5 represents a major tectonic feature in the western U.S. What is the name of this feature? (Hint: see Question #1)

4. Earth's Interior

4.1) Using the diagram below, draw and label Earth's **compositional** layers below. Also indicate the different **mechanical** layer inside the core. Note: your drawing does not have to be exactly to scale.



4.2) S-waves cannot travel through one major layer of the Earth. Shade this layer in the diagram above. What is special about this layer that makes the passing of S-waves impossible?

4.3) Which layer has the highest density? What type of material primarily makes up this layer?

4.4) Which layer has the lowest density? What type of material primarily makes up this layer?

5. Quakes & Faults

For this problem, you are going to investigate the active faults in near your hometown and inspect the current seismic activity. To do this, navigate to the following web address:

<http://quake.wr.usgs.gov/recenteqs/latest.htm>

5.1) Find the region of your hometown on the map and click on it (also provide the name below). Note: if you did not grown up in California or Nevada, choose a major metropolitan area like San Diego, Los Angeles, or San Francisco to answer the following questions.

City/Region of investigation: _____

5.2) Next click on the heading at the top of the webpage map that says

“Other Maps: Recent earthquakes with fault and topographic information”

Now you should be looking at a map that shows major streets (gray lines), faults (thick brown lines), and topography (pastel shades in the background). By simply running your mouse over each of the fault lines (don't click), you can observe which faults reside in the area. In the space below, list at least 3 faults. Note: if you choose a region with less than 3 faults, click the north, south, east, or west arrows to navigate to a region with additional faults.

Fault #1 _____

Fault #2 _____

Fault #3 _____

5.3) Now hit the “Back” button and return to the previous page. Then click on the “**List of Earthquakes on this Map**” link below the map. This should bring you to a list of earthquakes in your area that occurred over the last week. Use this information to answer the questions below. Note: If your area has not had any earthquakes, go back and click on the San Diego region.

5.3.1) What was the magnitude of the largest earthquake that occurred over the past week?

5.3.2) How deep was the hypocenter of this earthquake (don't forget units)?

5.3.3) What was the deepest hypocenter depth recorded this week?

5.3.4) Near what city/town did this deep earthquake occur?