LAB 3 – Plate Tectonics and the Seafloor

Name: Section number \_\_\_\_\_\_\_\_\_\_\_\_\_

Complete the lab and use this form as your answer sheet. Type answers in the Text boxes which will expand as you type in them.

# Lab 3.1 – Seafloor Features

1. What is the range in elevation from the deepest seafloor to the highest mountains near Japan?

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1. What is the range in elevation from the deepest seafloor to the highest mountains near the Northwest U.S.?

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1. What is the distance used for the horizontal scale on the Japan map?

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1. What is the distance used for the horizontal scale on the map of the Pacific Northwest?

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1. Describe any patterns or relationships between the topographic and seafloor features do you see?

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1. Describe the type of plate tectonic boundaries that exist at these locations?

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1. Are there any differences between the tectonic boundary in Japan and the Northwest U.S.? If so, what are they?

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1. What are some possible explanations for why there is no obvious deep-sea trench near Oregon and Washington?

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# Lab 3.2 – Plate Tectonic Settings

1. Across what time periods are you able to observe oceanic or geologic variables in the plot?
2. What is the first year that there are data?

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1. What is the last year that there are data?

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1. What is the range of earthquake magnitude?

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1. Referring back to Lab 3.1, what areas have the most earthquakes?

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1. Based on the concentration of earthquakes and the location and shape of seafloor features, what type of tectonic settings or boundaries are present and where are they located?

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1. What might the number of earthquakes at the mid-ocean ridge and transform zone indicate about plate movement? Is there a lot of motion occurring or not much?

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1. Which relationships between seafloor features and earthquakes are obvious?

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1. Why are so many earthquakes occurring in these areas?

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1. Referring back to Lab 3.1, what type of plate boundary apparently has the smallest magnitude earthquakes according to this data? Does this make sense? Why or why not?

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# Lab 3.3 – Earthquake and Tsunami Hazards

1. Relative to their depth of occurrence, what is the relationship of the earthquake locations to the seafloor features? Do these make sense (explain why or why not)?

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1. Where do the shallowest earthquakes occur?

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1. Where do the deepest earthquakes occur?

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1. Look closely at the deepest earthquakes. Do they have a pattern and if so, what is it?

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1. What type of boundary is likely indicated by the deepest earthquakes and the locations of mountain ranges on the nearby land in the Northwest U.S.?

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1. How do the land-based volcanoes support your answer to the last question?

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1. What is the number of earthquakes at this boundary relative to the mid-ocean ridge segments and transform zones? Is it more or less?

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1. What might the number of earthquakes in the subduction zone indicate? Why might it be different than at the mid-ocean ridge?

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1. What might be indicated by the small number and size of earthquakes in the subduction zone, both presently and the future?

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1. What does the reduced number of earthquakes in the subduction zone suggest about future natural hazards?

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1. If a large earthquake were to occur near the continental slope, how might it affect the slope? What other hazards might be associated with such an earthquake?

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1. Using your knowledge from Labs 3.1-3.3, explain how earthquakes, plate tectonics, and seafloor features relate.

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1. In thinking about your answer to the last question and the 2011 earthquake in Japan, what do you hypothesize about the potential for tsunamis in the Pacific Northwest region?

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1. List the coast closest to where you live (or a place you’d like to visit; i.e. near the east coast of the U.S.). What is similar or different about the plate boundaries? How might that change the natural hazard risk for tsunamis in that region?

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