

Lesson 2: Journey Across the Pacific– Teacher’s Key

Answer Key to Questions.

Question 1. What is the advantage of having a map inset box?

The map inset box orients the viewer to the geographic location on the Earth. GeoMapApp was designed as a data viewer and originally used to examine seafloor data sets, and does not display political boundaries or place name labels that most students will expect in a map. The inset box can help give a view of where in the world the map is focused on.

Question 2. What does the y axis represent?

Elevation or change in the seafloor, in meters. Also the distance under sea level, or depth underwater.

Question 3. What does the x axis represent?

Distance of the profile, in kilometers. It represents the distance traveled along the seafloor that correlates with the transect line drawn on the map.

***The scale of the x and y axis are different. This might be a good point in the lesson to talk about why you would not want to have the x axis in m or the y axis in km, as the current output provides a graphical scale that allows the viewer to imagine or envision the structure of the ocean floor topography.*

Question 4. Why are there negative numbers in the elevation?

The elevation numbers of the seafloor represent m from the surface of the sea (sea level), which is represented as 0 in the profile graphs.

Question 5. What is the elevation at 2000 km along the transect?

Answers will vary, example in lesson is ~ -4,000m

at 8000 km?

Answers will vary, example in lesson is ~ -6,000m

Question 6. What is the difference between the Great Circle and Straight Line features? Hint: Hold your mouse over the radio buttons for clues.

The Great Circle draws the shortest path between the 2 points, and is based on the curvature of the Earth’s surface. The Straight Line draws a straight line between the 2 points based on the current map layout.

Question 7. How many km in length was the distance between San Diego and Tokyo using the Great Circle method? Hint: estimate from the x-axis of your profile. 8,600 km.

Question 8. How many km in length was the distance between San Diego and Tokyo using the Straight line method?

9,200 km.

Question 9. What is the deepest part of the profile?

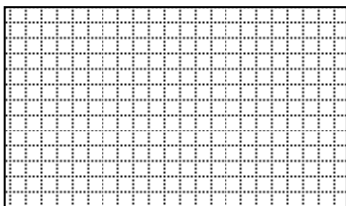
Near the coast of Japan, the depth reaches below 6,000 m. This is an area of the Mariana Trench, the deepest place on the planet.

Question 10. Find these features with the GEBCO Gazetteer, create profiles with the Distance

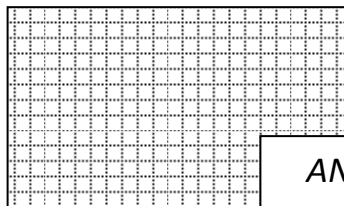


Profile Tool, and sketch the features in the gridded boxes. Which one looks like a mountain? A chain of mountains? A flat topped mountain? Label them with your answers.

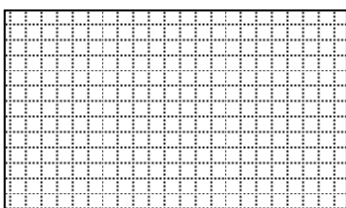
A. Hawaiian Islands



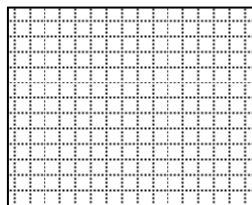
B. Mendocino Ridge



C. San Juan Seamount

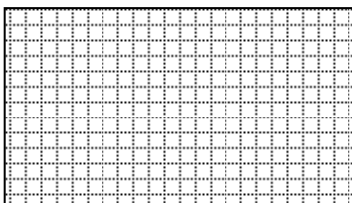


D. La Jolla Canyon

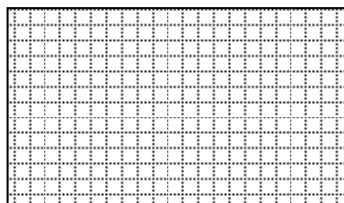


ANSWERS WILL VARY. The seamount will look like a ridge, the Hawaiian Islands will look like a chain of mountains, and the seamount will also look like a flat topped mountain.

E. Santa Monica Canyon



F. Monterey Canyon



Question 11. Choose a map area, zoom in and center the region, draw a profile of the seafloor and sketch your results in the diagram below. Include labels for the x-axis and y-axis. Label the distance traveled and elevation for at least 5 data points (numerical values). Include labels for any distinct features, such as land, trench, ridge, seamount, etc.

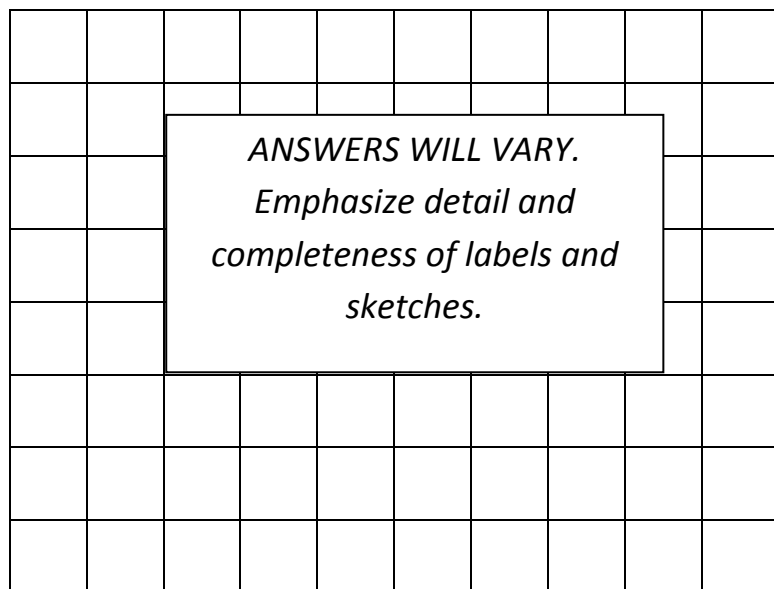
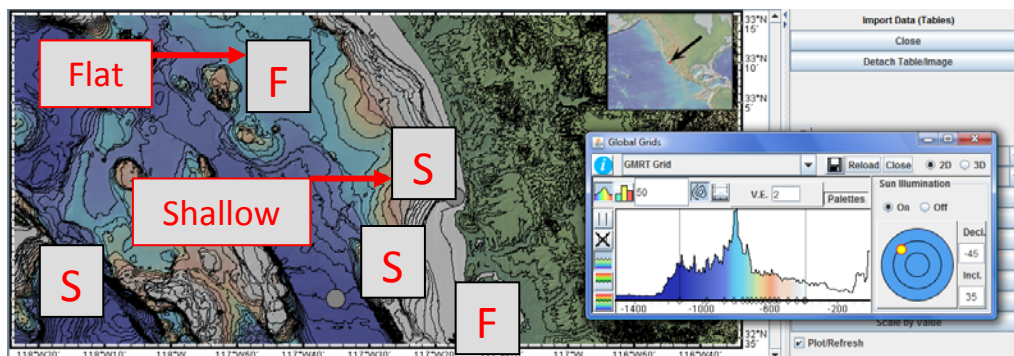


Figure 10. Sketch of GeoMapApp profile depicting seafloor bathymetry.



Question 12. How are contour lines useful in a map image? Where are the steepest slopes in the above image? Where are the flat areas?

Contour lines are lines drawn through elevations or depths of the same value, and give the map viewer a clue as to the elevation of the area and comparable areas and slopes of features in the map. Lines that are close together indicate a rapid change in elevation or depth or a steep slope. Lines that are far apart represent a gradual change in elevation or depth and highlight flat areas and gently sloping features. Adding contour lines gives more perspective and makes topographic and bathymetric features stand out in the map layout. The steep areas above are indicated with a red S and the flat areas with a red F. In general, the steep areas are located in the canyon off La Jolla (La Jolla Canyon) and flatter areas are in deep and very near shore waters (beach areas and San Diego Bay).

Question 13. Think about the different map layouts you have created. When would you use a black and white image?

The use of color in a map is best for a strong visual presentation and to create an interesting and aesthetically pleasing map. Map displays for interpretive purposes, such as a news clip, museum poster or sign, or powerpoint presentation benefit from the high visual impact of color. Any map that will be published on the web will more than likely benefit from rich, vivid colors that are aesthetically pleasing.

A map that is intended to be background image for a data set, such as currents, ocean temperature or migratory movements of animals might benefit from the use of a black and white image. And if the image will be black and white in the final presentation, for instance in a newspaper or written report, it should be created in black and white, so the map author can include visual cues other than color for the intended viewer, such as labels, arrows, and graphics that help convey the message of the data.

Question 14. What type of map product would you include contours on?

Any map where the bathymetric or topographic features are important should have contours. Oceanographic maps used for navigation might include contours to show areas with steep slopes or rapidly changing depths, and those intended for studying the variation of seafloor features should have contours. Hiking maps and geology maps for land features benefit from the use of contours. If the contours detract from the map, and make the overall appearance of the cartography too busy, the map creator should experiment with wider contour intervals or no contours and more dramatic use of color to highlight physical features.