Seafloor Features and Seafloor Mapping Lesson Plan
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(1) 90 min period

Summary:
The seafloor has a wide range of depths and features. Certain features, such as the mountain chain formed by seafloor spreading and trenches formed by subduction, are products of plate tectonics and our ever-changing earth. Main points of this presentation are: 1) The seafloor is not flat, but has many different features; 2) The deepest parts of the oceans are not in the center of the ocean; 3) The mountain range that exists throughout all of the ocean basins is the LONGEST geologic feature on Earth.

Materials:
Lecture_SeafloorFeatures.ppt Lecture Slides (including presenters notes contained within the powerpoint)
Activity_SeafloorFeatures.pdf
Print: 1 graph paper per group of 2-4 students
1 ruler per group of 2-4 students (5 rulers to a page)
Bathymetry maps (1 map per group; 8 maps in the packet)
DON'T distribute bathymetry profiles – those are for teacher
Worksheet_SeafloorFeatures.doc (1 per student)

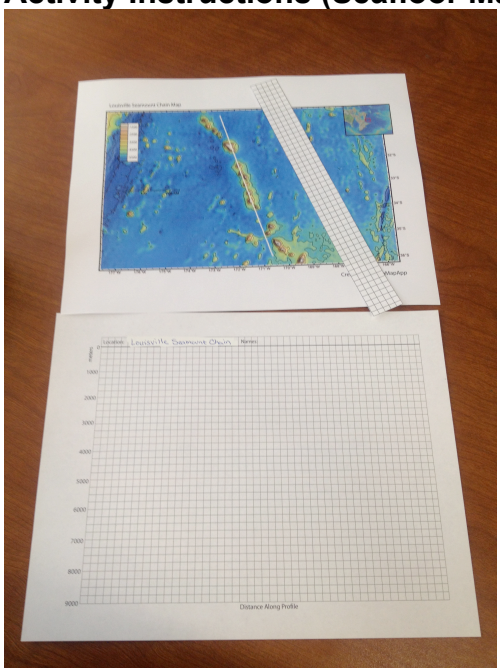
Documents:
Activity_SeafloorFeatures.pdf
Lecture_SeafloorFeatures.pdf
Lesson_Plan_SeafloorFeatures.pdf
Worksheet_SeafloorFeatures.doc

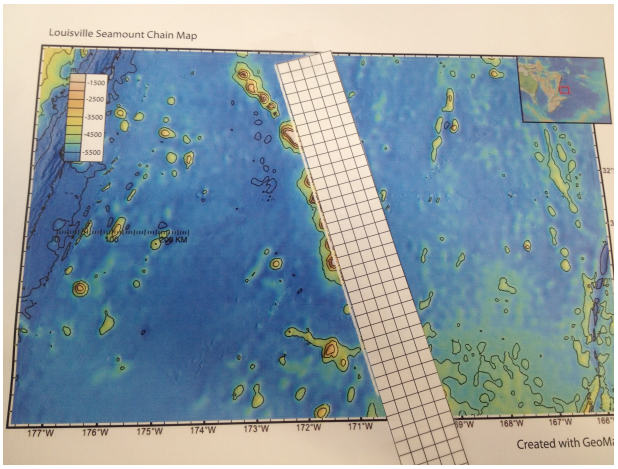
Prep: There is very little preparation required for this lesson. Make sure that materials are ready for students to use.

Lesson Plan & Instructions:
1. Warm up: Start with the pre-lab questions on the Seafloor Mapping Worksheet page.
2. Have students discuss the answers to the pre-lab questions as an introduction to the slides.
3. Present the Lecture Slides (annotated in detail on each slide). Have students take notes if you wish.
3. Distribute mapping activity materials (listed above). Each group gets 1 map, 1 ruler, and 1 sheet of graph paper. Each student gets 1 instruction/questions worksheet.
4. Students will use their rulers as a distance guide (1 measurement at each square on the ruler is 1 plotted point on the graph paper) to make a depth profile

along the white line in their map. Use the colorbar on the map to figure out the depth of the seafloor at each tick on the ruler (Note: the color scale is different on each map). Connect all the points in the plot to make a 2-D profile.
NOTE: The vertical exaggeration in the activity is large. That means that all of the features are stretched in the vertical direction compared to the horizontal direction. For example, 1 inch in the vertical represents ~1000 meters, while 1 inch in the horizontal represents ~100 meters. This is a vertical exaggeration of ten.
5. Groups will then share their profiles with the class, mentioning the shallowest and deepest depths.
6. Groups will tape their profiles side by side in order to see the depth variation. All the maps are drawn at the same scale so they are readily comparable.
7. Students then finish the worksheet individually.

Activity Instructions (Seafloor Mapping)

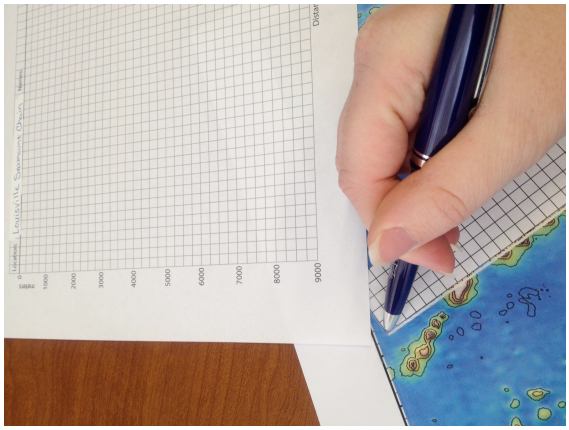




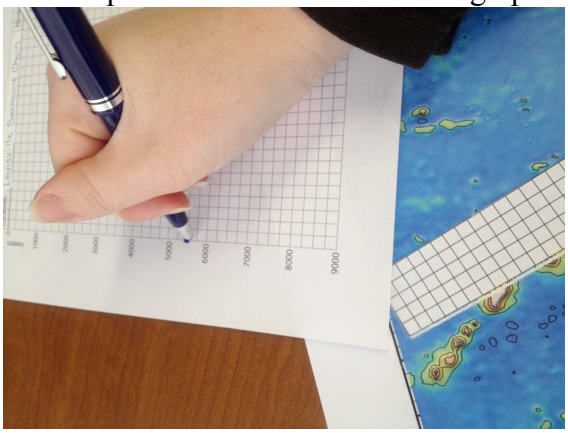


One measurement is made at each tick mark on the ruler. The ruler matches up exactly with the graph paper so one point is plotted on each line of the graph paper.

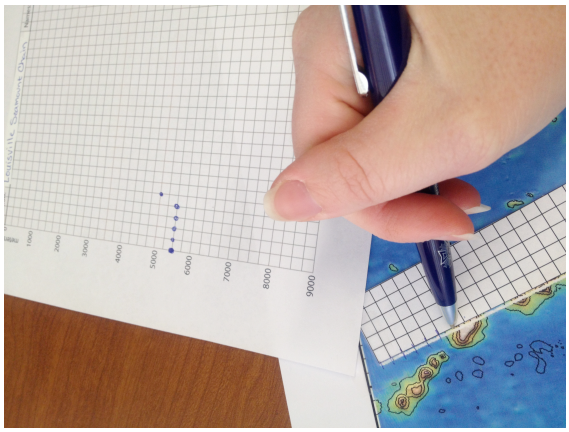
Make a measurement at the first tick



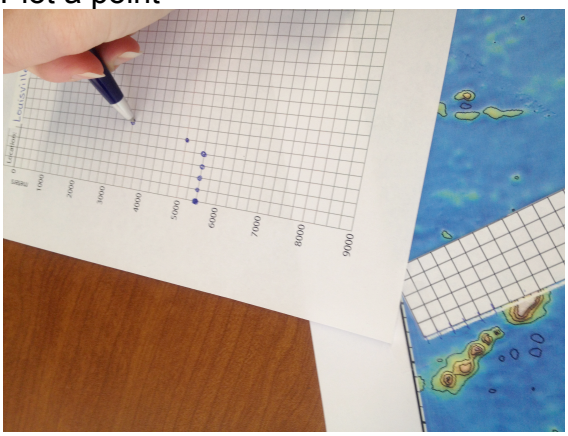
Plot the point on the first line on the graph



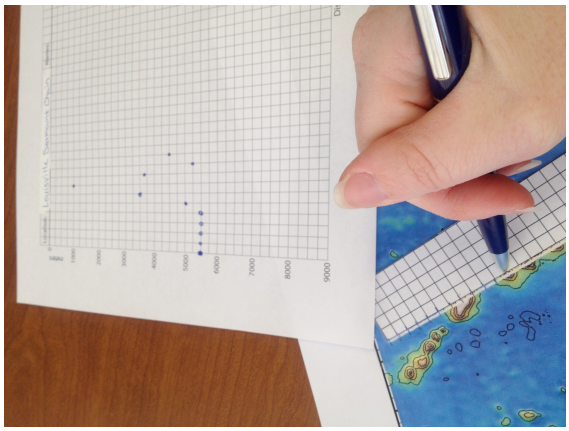
Make a measurement



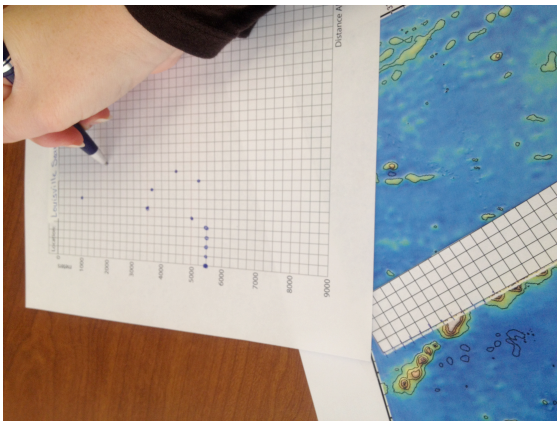
Plot a point



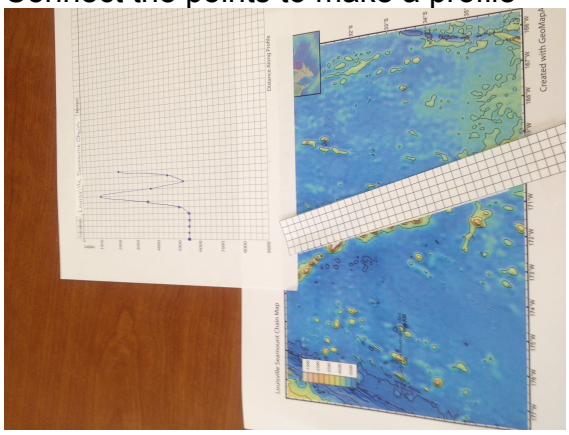
Make a measurement



Plot a point



Connect the points to make a profile



Seafloor Mapping Activity **Name ____KEY_____**

Keywords:
Bathymetry
Abyssal Plain
Trench
Seamount
Continental Shelf and Slope

Materials:
Map Handout
Graph Paper Handout
Graph Ruler

Instructions:

1. Place your ruler along the profile line (white line) on your seafloor map.
2. On each vertical line of your graph paper, you will mark the depth of the seafloor along the profile at each cross-line on your ruler. The colorbar on your map will help you choose the correct depth to mark on your graph.
3. Once you have completed the entire profile, connect the marks on your plot to form the shape of the seafloor.
4. Each group will present their graph and tape all the graphs side by side to observe the range of depths of the seafloor.

Pre-Lab Questions ("DO NOW"):
How deep do you think the seafloor is? What do you think the seafloor looks like? What is it made of?

Questions:
1. What is the approximate depth range of the seafloor in your profile? In all the profiles combined from the class?
~1000 – 6000 meters

2. Based on the profiles from the class, what is the seafloor shaped like?
The seafloor shape varies a lot, but it is NOT flat or shaped like a bowl.

3. Where are the deepest seafloor features usually located?
The deepest features are usually located away from the middle of the oceans.

4. Define the following terms, including where in the ocean they are located:
   a) Oceanic Ridge – A large underwater mountain chain located usually near the middle of the ocean basin.
   b) Trenches – The deepest part of the seafloor, located away from the center of the ocean basin.
   c) Abyssal Plain – The wide open part of the seafloor that is flatter in character than other parts of the seafloor, located between the trenches and oceanic ridge, the main part of the seafloor.