

Investigating the Deepest Ocean Depth

INTRODUCTION:

The deepest ocean depth is known as the Challenger Deep. It lies at the southern end of a major Pacific trench system known as the Mariana Trench, just south of the island of Guam (at $11^{\circ} 22.394' N$ and $142^{\circ} 35.541' E$). The deep was named after the British research vessel, Challenger II, that first discovered it. In the 1960's two scientists, Jacques Picard and Don Walsh, working with the US Navy, took the bathyscaphe Trieste to the bottom of the Challenger Deep, seven and one half miles below the surface.

In this investigation we will use bathymetric data from the British Royal Navy charts of the Mariana Island group to create a side view or profile of the Challenger Deep. To accomplish this you will plot a simple line graph using the data below. Plot depth on the y-axis and distance on the x-axis. (HINT: for a more dramatic effect set this graph up with your paper in normal, not sideways, orientation.) After you have drawn your profile, continue following the instructions which are found on the back of this investigation.

DATA:

<u>dist. km</u>	<u>depth m</u>
0	+404
8	-1280
16	-1000
24	-33
32	-1000
40	-3000
48	-3915
56	-4555
64	-3000
72	-2791
80	-3000
88	-2791
96	-3658
104	-3000
112	-3200
120	-2584
128	-3100
136	-4200
144	-7100
152	-8200
160	-11022
168	-10000
176	-9000
184	-8000
192	-7000
200	-5900
208	-5100
216	-4588
224	-4200
232	-3840
240	-3800

ANALYSIS:

- 1- Add a straight horizontal line across your graph at the 0 meter depth point and label it "ocean surface."
- 2- Next, use colored pencils or other tools to lightly color the water blue, the sky light blue and the lithosphere brown or rock grey.
3. From your knowledge of plate tectonics, place the following labels in their correct location below the line you have plotted (in the lithosphere area): Philippine Plate, Pacific Plate, Subduction Zone. Use a few neat arrows to show the direction of crustal plate movement in this region.
4. Draw additional horizontal lines **THROUGH THE BLUE, WATERY REGIONS ONLY** (don't draw through the lithosphere) at the following depths: 200 m, 2,000 m, 6,000m. Add a little green or yellow to the blue water between the surface and 200m only. Label the vertical life zones for all four areas on this graph.
5. Write a paragraph discussing the geological processes responsible for the formation of the Challenger Deep.
6. The deepest point is 11,022 meters deep. Convert this answer to (a) kilometers, (b) feet, (c) miles.

EXTENDED RESEARCH:

Find a nautical chart for some other interesting region of the ocean and create a data table like the one on the other side of this page. Chart the data and analyze it.

TEACHER'S GUIDE:

Depth Profile - the Challenger Deep

Latitude 11° 20' N Longitude 142° 30' E

