Oceanography

What are some characteristics of the ocean and the ocean floor?

Earths highest mountains, deepest valleys, and flattest plains are found not on land but under the ocean. Beyond ocean shorelines, the continents extend outward. They slope first gradually and then steeply down to the ocean floor. Beyond the slope lie trenches, valleys, plains, and ridges of the ocean basin.

These features are formed by tectonic plate movements occurring on the ocean floor. Where tectonic plates diverge, new crusts form underwater mountain ranges. Where tectonic plates converge, old ocean crust descends into trenches and is destroyed.

The features of ocean basins affect organisms that live in the oceans. Ninety percent of marine life occurs in the upper zone of the ocean. This is because plants and algae, the first links in the marine food chain, need sunlight to survive. Light intensity is measured by the extinction coefficient, which is the ratio between the light intensity at a given depth and light intensity at the surface.

In addition to sunlight, marine organisms also need nutrients, which are abundant near the edges of the continents and in places where currents bring nutrient-laden water to the sunlit surface. Continents are eroded by wind, waves, and rivers. Rivers carry sediment containing nutrient minerals to the ocean, where wave action and currents wash it farther out to sea. In deep water, below the sunlit surface and beyond the continental margins, most marine life depends on food falling from above, since photosynthesis cannot take place without light.

In this Virtual Lab you will use an oceanographic research vessels submersible to explore the characteristics of the ocean and its floor. You will gather light-intensity and temperature data at various ocean depths. You will identify ocean floor features and learn about organisms found at different ocean depths.

Objectives: 

* Describe the structure of the ocean floor. 
* Describe light intensity and temperature characteristics at different ocean depths.

Procedure: (Note: The ocean profile diagrams are not drawn to scale.)

PREPARE a Data Table for your observations/data collection (see below)

1. Examine the ocean floor. Click the Reference button to access information about ocean floor

structures.

1. Identify each ocean floor structure by dragging a Structure Label to the corresponding number near the structure.
2. After you have identified all the structures, click the Check Labels button. If the structures are identified incorrectly, their labels are highlighted yellow. Reexamine the structure and the reference information and try again.
3. When all the ocean floor structures are labeled correctly, click the Ocean Depth arrow and select the depth to which you want the submersible to descend.
4. The submersibles camera takes a picture of an organism seen at that depth. Examine the marine organism, and click the Hear button to find out more information about it.
5. Record the oceanographic data for the selected ocean depth in the Table.
6. Select a different depth and collect more oceanographic data.
7. Drag the research vessel to another location and repeat the Virtual Lab.
8. Complete the Journal questions.

Data Collection: Draw a Data Table with the following headings….. ADDING rows for each location as indicated

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Ship Location | Ocean Structure | Ocean Depth  (m) | Temperature  (C0) | Light Intensity  (%) | Marine Organisms |
| *A (needs 3 rows)* |  |  |  |  |  |
| B *(needs 7 rows)* |  |  |  |  |  |
| C *(needs 8 rows)* |  |  |  |  |  |
| D *(needs 7 rows)* |  |  |  |  |  |
| E *(needs 8 rows)* |  |  |  |  |  |
| F *(needs 8 rows)* |  |  |  |  |  |
| G *(needs 7 rows)* |  |  |  |  |  |
| H *(needs 3 rows)* |  |  |  |  |  |

Journal Questions

1. What color was the oceanographic research vessel from which you collected your data?
2. What conclusions can you draw from the data compiled in your Table?
3. Describe the general structure of the ocean floor.
4. Which structures on the ocean floor are equivalent to mountains on land?
5. Based on data you have collected, how far down into the ocean does sunlight reach?
6. Would you expect to find plantlike organisms below 1000 m in the ocean? Why or why not?
7. About 90 percent of all marine organisms live in the upper 180 m of the ocean. Explain this fact in terms of temperature and light intensity.
8. If you could drop Mount Everest (height: 8848 m) to the bottom of an ocean trench, would its summit reach the level of the ocean's abyssal plains?
9. The ocean's sunlit environment is generally much richer in marine life closer to the continents than is the open sea farther from the continents. Explain why the open sea is sometimes called the blue dessert.