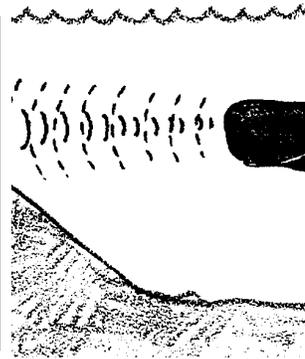


Deep Sounds

Key Concepts

1. Technological developments have made it possible for us to get an accurate picture of the ocean floor.
2. The ocean floor has features very similar to those of the land.



Background

While humans have been traversing the surface of the ocean for thousands of years, it has only been within the last half century that we have been able to say with any reasonable certainty how the bottom of the ocean looks. Submarines and submarine warfare fostered the development of echo-sounding and sonar equipment. After World War II this equipment became more widely available to oceanographers.

The first sonar devices produced a single beam of sound which could be used to trace a depth profile line across the bottom. While these devices were a vast improvement over mechanical sounding with a lead line, recently developed multibeam sonars which trace a swath across the bottom have truly revolutionized bathymetric mapping. These devices have permitted us to make continuous recordings of depth and thereby map the bottom with considerable ease and accuracy.

The information obtained provides important evidence in support of the theory of plate tectonics. It now appears that sea floor topography is, in fact, largely a result of the processes involved in plate movement. Bottom profiles have also provided information important to sea bed miners and oil drillers. “Deep Sounds” looks at some of the discoveries.

Materials

- student handout

Teaching Hints

“Deep Sounds” serves as an introduction to and preview for several activities dealing with the topography of the ocean floors. Duplicate the text pages. One set is recommended per student. This activity is best accomplished by

individual students as homework or as an in-class assignment. There is merit in having the students meet in small groups after each individual has completed the assignment. The groups provide an opportunity to exchange and compare answers prior to a general class discussion of the material.

Key Words

abyss - the deep ocean

abyssal plain - flat sections of the deep ocean floor

atoll - seamount ringed with coral

continental shelf - submerged margins of the continent

continental slope - steep slope separating the continental shelf from the deep ocean basin

coral - calcareous skeleton-producing invertebrate; skeletons often form large reefs

guyots - flat-topped volcanoes which have subsided beneath the water's surface

ridges - long narrow chain of underwater mountains

seamounts - underwater volcanoes which have not reached the water's surface

silt - fine sand or clay carried by running water

sonar - a method for determining depth using sound waves

soundings - a method for determining depth using a weight and line

submarine canyons - "U"-shaped underwater canyons in the continental slope

trench - long, narrow, deep depressions in the sea floor associated with zones of subduction

turbidity currents - dense current of sediments moving along the slope and floor of the ocean

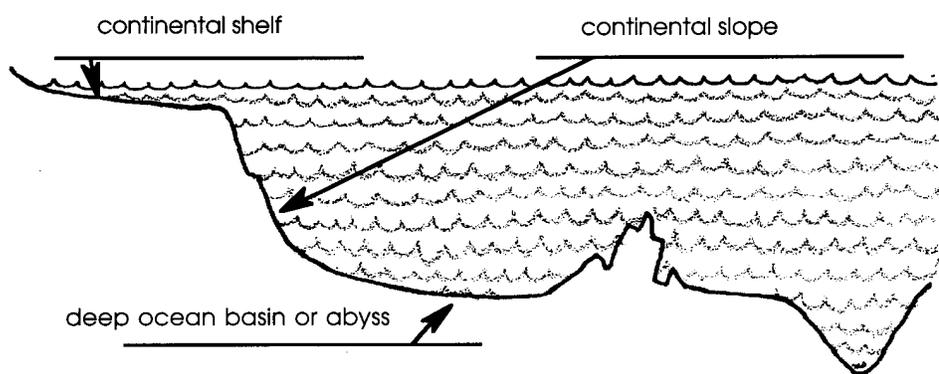
Extensions

1. This topic lends itself well to bulletin board displays. Supplement the text material with films and/or filmstrips. Encourage your students to bring in articles and other supplementary materials relating to the topics under consideration.

Answer Key

1. Fishers are interested in the bottom profile to keep from running aground and to keep from entangling and losing their gear. Since certain fish and/or shellfish are found at specific depths or over specific types of bottoms, fishers also use bottom profile information to tell them where to fish. The bottom profile reproduced in the text shows another reason fishers are interested in echo sounders. Schools of fish show up as shaded blips on the recorder. The ability to pin-point schools of fish has increased the fisher's ability to locate and catch fish. New echo sounders can even detect individual fish. There is some reason for concern that this sophisticated gear may lead to over fishing and the extermination of some (or many) fish stocks.

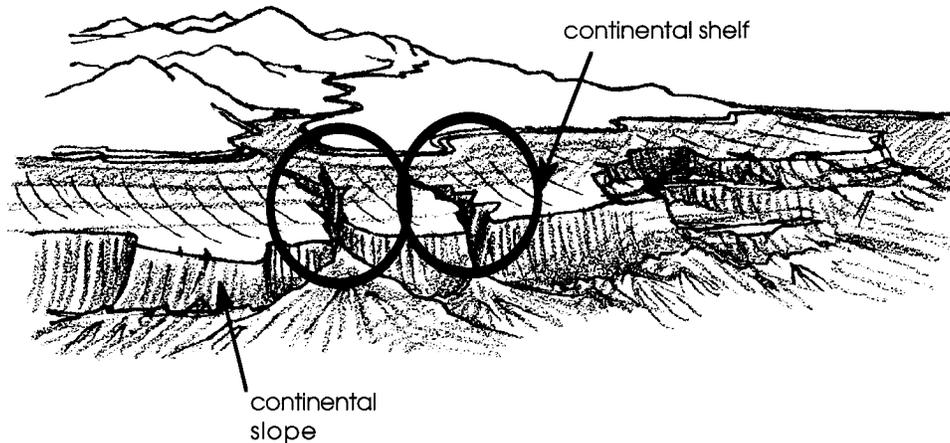
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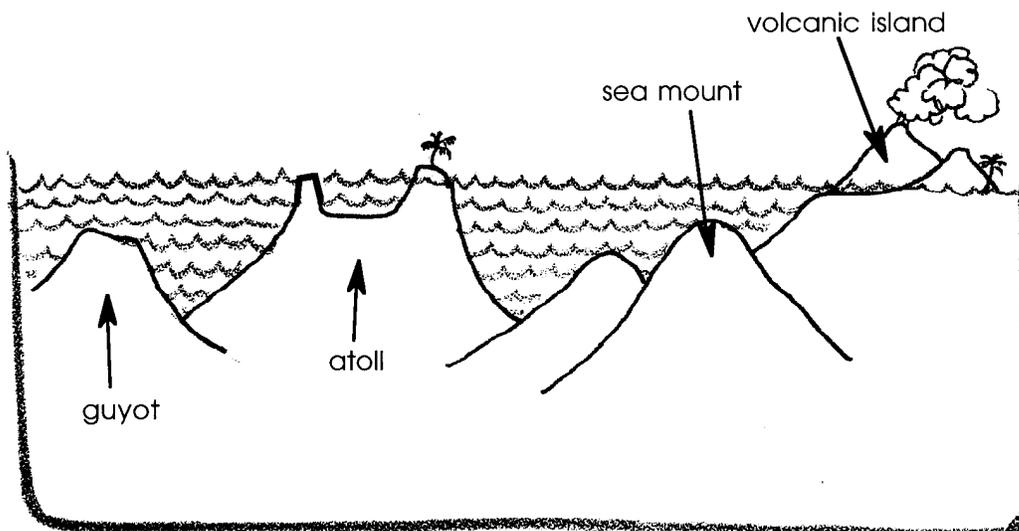
3.



4. a. Turbidity currents are torrents of silt-laden water that flow down the continental slopes. Essentially they are underwater avalanches that flow because the currents are more dense than the surrounding sea water.
- b. Turbidity currents shape the continental slope by scouring deep submarine canyons as they flow downward.
- c. The most likely locations for turbidity currents are shown on the figure below:



5. Submarine peaks, ridges and other features are preserved relatively unchanged because the forces of wind, rain and frost that wear away geologic features above the ocean's surface do not act below the ocean's surface.
6. A correctly labeled figure is shown below:



7. The echo-sounder and sonar are major research tools that have enabled oceanographers to “see” the ocean floor.

Name That Shape

“Name That Shape” serves as a vocabulary review for “Deep Sounds”. The correct answers are found below.

Scientists have measured the great depths of the ocean. They’ve found that the shape of the ocean floor, or topography, is very much like that of the land. Some of the underwater formations they found are listed below. Draw a line from each word to its correct definition.

- | | |
|----------------------|--|
| 1. abyssal plain | A. a volcanic peak rising from the sea floor that is “flat-topped” because of earlier wave action. |
| 2. atoll | B. the sea-bed along continents that forms a gentle slope. It is covered by shallow water ranging from a few to hundreds of kilometers wide. |
| 3. continental shelf | C. a submarine volcanic peak. |
| 4. guyot or plateau | D. a seamount with a ring of coral growing around it. |
| 5. ridge | E. narrow, deep cuts with steep slopes. |
| 6. seamount | F. a peak formed by lava rising above sea level. |
| 7. trench | G. a long, narrow rise in the sea floor with steep sides. |
| 8. volcanic island | H. deep; covered with a thin layer of sediments. |