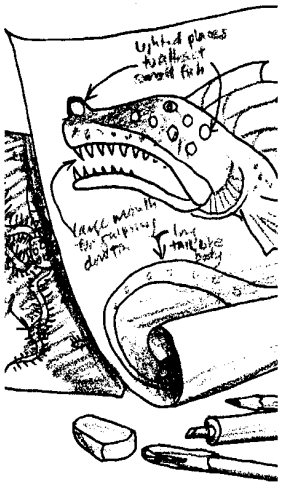
Designing Deep Sea Life

Key Concepts

1. Our original ideas about the deep sea were based upon observations we made about life on land and experiences we had in the water.

2. Some scientific theories develop from observations and deductive reasoning.

3. Theories and hypotheses are revised as new information becomes available.



Background

The Deep Sea has long been considered a mysterious and unreachable habitat. Early sailors imagined that it was bottomless and populated by fantastic monsters. Restricted to the surface, humans could only peer over the sides of their ships into the dark. To measure the depth of the ocean, sailors would lower a sounding line, a rope marked at regular intervals and weighted with lead. They would mark the line when the weights hit the ocean bottom and use that mark to calculate the depth of the waters. Close to land, they could easily measure the depth of the water. But when they moved out of sight of land, they often did not have enough line for the weights to reach the bottom. Small wonder that many sailors thought the ocean must be bottomless.

As more and more ships made their way around the worlds oceans, measurements were taken more accurately, and people realized that the ocean while not bottomless, was certainly very deep. Today we know that the average depth of the world ocean is about 4,000 m or 12,000 ft.

Originally, our knowledge about the physical conditions of the deep sea were based upon our observations near the surface. When swimming in the ocean, the deeper one went, the darker it was. We concluded that it must be completely black at the ocean bottom.

Also, it made sense that since the sunlight did not penetrate the ocean water to bring light, it could not bring heat to the water either. Observations told us that the deeper we went, the colder it was. We concluded that it must be very cold at the ocean bottom.

Also from direct experience, we knew that when we swam down into the water, the pressure increased. We could feel the water pressing in on our eardrums. We concluded that there must be tremendous pressure at the ocean bottom.

What we knew about living things and their survival needs, led us to believe that very little could survive in the deep sea. First of all, there would not be enough light for plants to grow. With no plants, the only thing left for animals to eat would be other animals or detritus (the remains of dead plants and animals) filtering down from the surface. And not much of that would be left by the time it reached the bottom of the sea.

We assumed that if anything could possibly survive under such pressure in a very cold, completely dark environment, with practically nothing to eat, it must be very strange indeed.

Materials

For each student:

- paper
- paints
- felt markers
- scissors
- miscellaneous art supplies

Teaching Hints

In this introductory activity, students use their current knowledge of the deep sea and of animal life to design imaginary animals that could exist in the deep sea environment. Encourage creativity coupled with careful thought about what an organism requires to survive and the physical constraints of the deep sea environment.

Key Words

behavioral adaptations - specific behaviors that organisms carry out that help them survive; birds building nests, wolves marking their territory are examples of behavioral adaptations

organism - a form of life considered as an entity; an animal, plant, fungus, protistan, or moneran

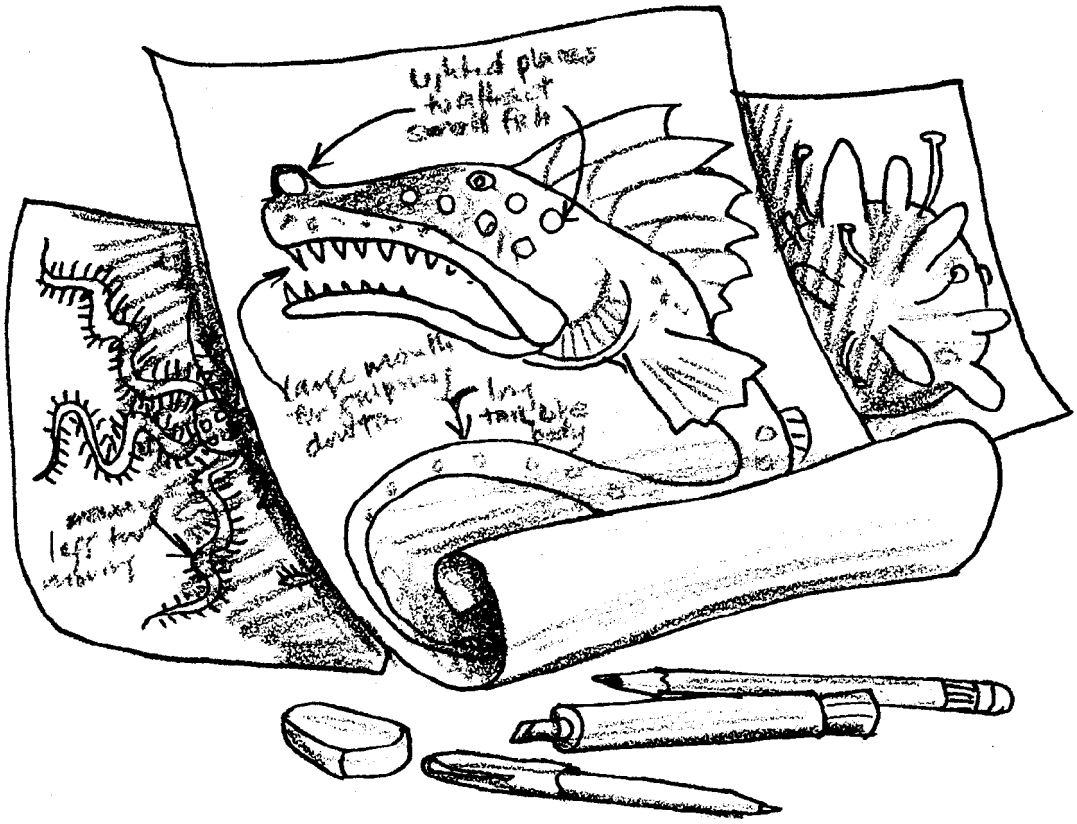
physical adaptations - body structures or parts that help an organism survive; large eyes, protective coloration, sharp claws are examples of physical adaptations

Extensions

1. Have students imagine that they were sailors making one of the first trips across the oceans. In their nets, they pulled up one of the animals designed by the class. Knowing what happens to "fish stories", have them prepare a story to tell their friends once they return home.

2. Save these original deep sea drawings and descriptions and have students compare and contrast them to the organisms that have actually been found to inhabit the deep sea.

Designing Deep Sea LIfe



Our early ideas about the deep sea were based upon the observations we made. We could not see into the deep sea. We had to guess about what the animals living there looked like.

We based our guesses or hypotheses on what we knew. We knew a lot about living things we had seen on the land and in the ocean. We also knew a lot about their needs and adaptations.

We based our guesses on what we assumed about the deep sea environment. It was probably flat, very dark, and very cold. It was probably under great pressure from the water pressing down from above.

What else do you know about the deep sea? In the following activity you will use that knowledge to design deep sea animals.

Materials

- paper
- paints
- felt markers
- scissors
- miscellaneous art supplies

Procedure:

1. Play the role of an early natural scientist. Design three animals that you might expect to find living in the deep sea.

   Make sure each of your organisms has a way to:

   breathe (take in oxygen)

   respond to its environment (sense organs of some type)

   find and consume food

   find a mate, and

   move through the water.

   Include behavioral adaptations as well as physical adaptations. Physical adaptations are body parts that help an organism survive. Large eyes, protective coloration, sharp claws are examples of physical adaptations. Behavioral adaptations are specific behaviors that help an organism survive. Birds building nests, crabs hiding under rocks are examples of behavioral adaptations.

2. Draw a picture of each animal. Note its approximate size, and give it a "scientific name". Remember, many animals are named after their discoverers.

3. For each animal, note what type of food it would eat. Also note how it would find that food.

4. Share your drawings with other members of the class. Be sure to explain the special features that allow your animals to survive in the Deep Sea.