Lesson Plans Library 6-12 > Life Science

Make it a Habitat

Grade Level 6-8, 9-12

Subject Area life science

Curriculum Focus nature/wildlife, animal behavior, genetics

Duration 2-3 hours

Objective

Students will consider the adaptation of life forms through natural selection to fill various niches and accommodate changing environmental conditions.

Materials

paper and pencil, resources for research (such as the Internet)

Motivation

Sharks, whales, snakes, bears, dogs, cats, killer bees, elephants and great apes! Oh my! What do these animals have in common? Like humans, they have successfully evolved to share our planet. Each is uniquely designed and intimately connected to the environment in which it lives. Whether invertebrate or vertebrate, warm-blooded or cold-blooded, scaly or covered with fur, each has a unique origin and evolutionary history—a history that continues to evolve as the result of the interaction between genetics and the environment.

Procedure

Part I

1. As a class, discuss the concept of a dynamic ecosystem—a community of plants, animals and microbes interacting with each other and their environment. The

   term ecosystem describes both the living and non-living components of an area that interact with one another. An ecosystem may be aquatic or terrestrial. Learn about several different biomes on thebiomes page.

2. Form small groups of four students each. Each group should select one of the ecosystems on the biomes page and conduct research to provide as much detailed information as possible about the chemical, geological and physical features of the environment. Consider the sunlight/energy, temperature, waves and other physical features of the system. This research will enable you to design an organism suited for living in the biome you select.

3. Now, investigate several types of adaptation on theadaptations page. In order to design an organism for your biome, it's important to know what characteristics enable it to survive. Make a list of the traits you feel are most important for an organism in this biome.

4. You are now ready to design an organism uniquely adapted to the environment you selected. Designing both internal and external body parts, your small group should consider:

   body design/symmetry
   diet/acquiring food
   shelter/protection/skeleton
   mobility
   sensory ability
   communication
   reproduction/life cycle
   temperature regulation/respiration/metabolism
   digestion
   waste removal/water regulation
   other unique adaptations/behaviors

5. Prepare a group oral presentation complete with a sketch or model of your organism in its environment. The presentation should answer the following questions:

   1. How does each adaptation function with respect to the environment?
   2. Which adaptations are the most significant (i.e., have the most adaptive value)?

   After each group has made a presentation, the following discussion questions might be used:

   1. What are some similarities between the organisms designed by each group?
   2. Could the organisms co-exist in the ecosystem by occupying different habitats and niches?
   3. What happens when two species try to occupy the same niche?
   4. How do animals reduce competition when food resources become limited?

Part II

Enter an environmental stressor into the ecosystem such as a volcanic eruption, drought, soil erosion, toxic waste, storm, etc. Each group should reevaluate their

designer organism as to how well its features would allow it to adapt to the new environment. Discuss as a class which organisms would survive and why. Explain how the process of natural selection impacts your organism and the chosen biome.

Closure

Prepare an ecosystem (either aquatic or terrestrial) in a glass container (fish bowl, aquarium, etc.) Describe the abiotic (nonliving) factors present. Write up the rationale for the selection of organisms that you include. Describe their adaptations and interactions with each other and the environment. Over time, depending on the animals kept, explore the following:

natural history of different phyla
feeding habits
social interactions
coloration/camouflage
competition
predator/prey relationships
adaptations
reproduction
food chains

How do the features observed enhance the survival of the organisms? Integrate these studies with studies of the chemical and physical properties of your mini-environment. Note: the collection or purchase of organisms ought to be a model of sound conservation practices and environmental ethics!

Credits

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