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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

★ Related Materials

Engineering at the Cutting Edge: Roller Coasters: Maximum Thrills, Minimum Danger DVD

Product Type: DVD
Price: 69.95

This series is designed to capture and ignite young people's interest in



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 the [biomes 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 the [adaptations 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

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◆ 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

Our thanks to Sue Mealiea, a science teacher at Woodbridge Senior High School in Woodbridge, Virginia, and Lisa Wu, a science teacher at Thomas Jefferson High School for Science and Technology in Alexandria, Virginia.

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