Design an Ecosystem

Objective

Students will describe various adaptations and how they enable the organism to survive in its habitat.

Materials

- ❑ one ounce of clay (any color)
- ❑ construction paper
- ❑ markers
- ❑ Internet or library access
- ❑ photocopy of world map

Background

Every animal must eat to survive, and in every ecosystem there are predators and prey. To understand the relationship and delicate balance between predators and prey, scientists use a tool called a food chain. A food chain is a diagram that shows the transfer of energy via "who eats whom" in an ecosystem. In a single ecosystem there may be many food chains that interconnect in many ways. A combination of food chains is called a food web. Food webs show us that if one population is impacted by environmental changes, many others will also be affected.

Action

1. Explain that the students will create a model of an ecosystem with several species of plants and animals. Some ecosystem suggestions are desert, arctic, tropical, marine, wetland, freshwater, etc. Students may work in groups of four and each group must select a di□erent ecosystem to research.
2. Instruct students to define their ecosystem clearly. They must describe the ecosystem and locations where it may be found. The students should have a photocopy of a world map and highlight the areas that the ecosystem may be found.
3. Next, students must identify five plant species and ten animal species living in the ecosystem. The following information must be included about the native plants and animals. See the teacher's example page for a sample.

Plants		***Animals***	
Division	*Genus*	*Range*	*Genus*
Division description	*Species*	*Habitat*	*Species*
Range	*2 Adaptations*	*Diet*	*Reproduction*
Habitat	*Description*	*5 Adaptations*	*Size/Weight*
Life Span	*Size*	*Life Span*	*Description*

4. Instruct students to create a model of their ecosystem using clay, construction paper, pictures, drawings, markers, etc.
5. The students will present their models to the class and explain all plant and animal species to the class as well as how they are adapted for their environment. Additionally, the students should describe the ecosystem's energy ow (food web) and the importance of biodiversity. (Plants and animals are connected and a disruption in one part of the food web will a□ect other areas.)

Polar Bear

Genus: Ursus
Species: maritimus
Description: The largest land carnivore. Adapted for cold with a thick fur coat. Smaller ears, longer necks and lack of dorsal hump in adults distinguishes polar bears from other bear species.
Range: Circumpolar arctic
Habitat: Inhabit Arctic sea ice, water, islands, and continental coastlines
Diet: Includes mostly ringed and bearded seals and also includes other seal species, walruses, narwhals, beluga whales, whale carcasses, fish, reindeer, birds, eggs, berries, and kelp.
Gestation: About 8 months; includes about a 4 month period of delayed implantation
Size/ Weight: Male-770 to 1433 lb. 8.2 to 9.8 ft. long; Females-331 to 551 lb. 6.6 to 8.2 ft. long
Life span: Typically 15-18 years; some have lived over 30 years
Status: CITES Appendix 2; listed as Threatened under the U.S. Endangered Species Act

Adaptations:
1. Strong swimmers. Have been tracked swimming continuously for 100 km (62 mi.)
2. Makes shallow dives. Reaches depths of 9.8 to 14.8 ft. Can remain submerged up to 2 min.
3. Body temperature is normally 98 degrees F and maintained through a thick layer of fur, a tough hide, and an insulating fat layer (up to 4.5 in. thick.) This excellent insulation keeps a polar bear warm even when air temperatures drop to -34 degrees F.
4. Large paws compared to body size, reaching 12 in. in diameter. The large paws act like snowshoes, spreading out the bear's weight as it moves over ice and snow.
5. Small ear size enables the polar bear to conserve body heat.
6. Polar bears are completely furred except for the nose and footpads.

California Barrel Cactus

Division: Magnoliophyta Division Description: Flowering plants
Genus: Ferocactus
Species: cylindraceus
Range: Sonoran and Chihuahuan deserts of southern California
Habitat: Desert areas
Description: Spines are dense, light yellow to bright red hiding most of the plant barrel. Flowers appear in July and August and are orange, red, or yellow in color.
Size: 4-8 feet
Life Span: Perennial= present at all seasons of the year (without interruption).

Adaptations:
1. Spines of the cactus protect it from browsing desert herbivores.
2. Waxy coating of the plant that surrounds the skin prevents evaporative water loss.