

Animals and Ecosystems: *Discussion Guide*

Overview

Just as we're shaped by our surroundings, so are the planet's creatures. Help your students better understand the relationship between animals and their environments with this discussion guide and its related videos and activities.

They'll begin by traveling to Guyana's savannah for a look at the anteater. Then, they'll visit the Arctic to see how the widespread melting of ice floes is affecting polar bears. An introduction to the meerkat examines the physical adaptations that make this animal well-suited for desert living. And the guide ends with a look at the tiny animals responsible for coral reefs and their fellow cnidarians.

Classroom Activities

1. Show the "The Savannah" segment from *The Jeff Corwin Experience: Guyana: Rain Forest Ecosystem* program.
 - **Discussion:** Were students surprised to hear that anteaters eat termites? (*Explain that their diet includes a range of insects, but mostly ants and termites.*) In the video clip, students learn that anteaters have a long sticky tongue that flickers in and out of the mouth 150 times a minute. Help students better understand just how fast this is by asking them to calculate how many times the anteater's 24-inch tongue flickers in and out in a single second. (*2.5 times per second*)
 - **Geography Investigation:** The anteater Jeff Corwin follows in the video lives in a savannah. Ask students to describe the habitat they saw. (*In the video, Jeff describes it as dry, flat, and grassy.*) Working individually or in pairs, have students use textbooks, library materials, or the Internet to research this biome and write a one-paragraph summary in which they explain in their own words what a savannah is. Ask for volunteers to share their paragraphs with the class. Then discuss what adaptations or behaviors animals would need to live in a savannah.
 - **Classroom Game:** Divide students into six groups—Habitat, Feeding, Breeding, Body Features, Behavior, and History—and send the groups to The Online Anteater Web site (<http://www.maiaw.com/anteater/>). Explain that each group's task is to write five challenging questions. The questions can be a mix of multiple choice and true or false, but the groups must include the correct answer with their questions and label them with their

group's name. Collect the questions and reassemble the class into three teams—Habitat & Feeding, Breeding & Body Features, and Behavior & History. Play a quiz game in which you randomly read the groups' questions, allowing the two uninvolved teams to compete for the first correct answer. Keep score, assigning two points for every right answer and subtracting one point for each wrong one.

2. Show the “Mammals on the Arctic’s Ice Platform: Caribou, Polar Bear, and Walrus” segment from the *Biomes: Wild Arctic* program. (Access to *unitedstreaming* is required.)
 - **Discussion:** Ask students: Why was the biologist’s discovery that polar bears in Hudson Bay weigh less than they used to important? (*It gave the world an early warning of the unexpected impact of small changes in temperature.*) Why is it bad for the bears that the ice melts earlier? (*It means they have to spend more time swimming between floes, which uses more energy. To maintain their fat reserves—crucial for nursing females—the polar bears have to hunt more.*)
 - **Genetics Investigation:** In the video, students hear, “Ice connects different populations of bears and helps to maintain genetic diversity.” Divide the class into small groups, and explain that their task is to use text books, library materials, and the Internet to research the question, “Why is genetic diversity important for a species?” Have the groups summarize their findings in creative presentations.
 - **Polar Expedition:** In early 2005, the International Polar Foundation released a free educational CD-ROM filled with animations about the polar regions and climate change. For the cost of shipping, IPF will send the disc to you. Alternately, you can download its contents. Working individually or in pairs, have students explore at least these three animations: Description and Movement of the Ice, Polar Bears and Penguins, and Sea Ice. Visit the Publications page of the IPF Web site for contact details and the download link:
 - <http://www.polarfoundation.org/index.php?s=6&rs=home&fct=latest&lg=en>
3. Show the “Meerkats Adapt to the Desert Biome” segment from the *Science Investigations Life Science: Investigating Ecosystems and Biomes* program. (Access to *unitedstreaming* is required.)
 - **Discussion:** Ask students: What physical adaptations make meerkats well-suited to life in the desert? (*Their front claws are long and curved, like shovels, making it easy for them to dig burrows in the desert sand. Meerkats can close their ears completely to keep out the sand and they have dark markings around their eyes that function like built-in sunglasses. And, perhaps most importantly, they do not need to drink water to survive.*)

- **Science Investigation:** In the video, students hear that meerkats “dig burrows, a complicated system of tunnels, sleeping chambers, and escape holes. Meerkats use them for shelter from the extreme temperatures and from predators.” Have them investigate another animal that lives at least primarily underground. Students can find a list of animals to select from at <http://www.enchantedlearning.com/coloring/Underground.shtml>. Using what they’ve learned, have students create a poster for their animal that includes at least one picture and lists the animal’s adaptations and behaviors that allow it to live underground.
 - **Related Viewing:** Meerkats are able to eat scorpions because they are immune to the arachnid’s venom. Have students watch the “Black Scorpions” segment of *The Jeff Corwin Experience: Morocco: Mysterious Desert Ecosystem*, which takes a look at how scorpions are milked in order to create antivenom. (Access to *unitedstreaming* is required.)
4. Show the “Coral Ecosystems” segment from the *Science Investigations Life Science: Investigating Animals* program. (Access to *unitedstreaming* is required.)
- **Discussion:** Were students surprised to learn that coral are small marine animals? (*Explain that coral reefs are the limestone structures composed of the skeletons of coral polyps.*) Ask students: How are jellyfish different from other cnidarians? (*While the life cycle of some jellyfish includes a polyp stage, these animals eventually float free.*) What is the function of the long stinging cells on jellyfish tentacles? (*They allow jellyfish to inject their prey with a paralyzing venom and to discourage predators.*)
 - **Reef Life:** Working individually or in pairs, have students create coral reef dioramas that show the variety of animals that inhabit these thriving communities. Point students to the following Web sites for research information and images:
 - <http://www.seaworld.org/infobooks/Coral/home.html>
 - <http://www.coralreef.org/resources/photobank.html>
 - <http://www.reef.edu.au/>
 - **Chemistry Investigation:** In the video, students hear, “Bioluminescence is the ability of a living thing to produce its own light. The light is the result of chemical reactions that take place in the organism’s cells.” Working individually or in pairs, have students visit the following Web site to learn more about this chemical reaction:
 - <http://www.lifesci.ucsb.edu/~biolum/chem/>
 Then, have them use the periodic table to identify the elements that make up the Coelenterazine molecule, the luciferin used by cnidarians. A diagram of the molecule can be found at:
 - <http://www.lifesci.ucsb.edu/~biolum/chem/detail2.html#coelenterazine>

Academic Standards

National Academy of Sciences

The National Academy of Sciences provides guidelines for teaching science in grades K–12 to promote scientific literacy. To view the standards, visit this Web site:

<http://books.nap.edu/html/nses/html/overview.html#content>.

This discussion guide addresses the following national standards:

- Life Science
 - Grades K–4: The characteristics of organisms; Life cycles and organisms; Organisms and environments
 - Grades 5–8: Structure and function in living systems; Regulation and behavior; Population and ecosystems; Diversity and adaptations of organisms
 - Grades 9–12: Interdependence of organisms; Behavior of organisms

Mid-continent Research for Education and Learning (McREL)

McREL's Content Knowledge: A Compendium of Standards and Benchmarks for K–12 Education addresses 14 content areas. To view the standards and benchmarks, visit:

<http://www.mcrel.org/compendium/browse.asp>.

This lesson plan addresses the following national standards:

- Science
 - Life Sciences: Understands relationships among organisms and their physical environment
- Geography
 - Physical Systems: Understands the characteristics of ecosystems on Earth's surface
- Language Arts
 - Writing: Uses grammatical and mechanical conventions in written compositions; Gathers and uses information for research purposes
 - Viewing: Uses viewing skills and strategies to understand and interpret visual media