

14. What are some farming techniques developed to prevent another Dust Bowl from happening?
15. What are ecologists doing to reclaim the grasslands?
16. What adaptations do native grasses have that protect them from over-grazing and from being trampled by cattle?
17. What are decomposers? Why are they important in every biome?
18. What do prairie dogs and earthworms have in common?
19. What are some of the adaptations of grasslands animals?

Follow-up Discussion

Research indicates that students will retain their previous misconceptions about a topic, in preference to new information, until they actively recognize and correct their own errors. Therefore, it is important to have your students re-examine the facts/beliefs they put on their "Everything We Think We Know About..." list. It might also be helpful to review the list by marking each entry with a "+" or "-" to show which facts were correct and which were incorrect.

Discussions that ensue from thought-provoking discussions provide a good way to assess the overall depth of student understanding. The following are some suggested discussion topics.

- Describe the conditions in which a grasslands area might change into a forest.
- Explain how soil moisture affects all the organisms in a biome.
- Describe a typical grasslands food chain.

Follow-up Activities

- Have students learn about different types of grass seeds available by visiting a local garden store or reading a seed catalog. Help students plant many types of grass seed and ask them to observe and record any differences in growth pattern, appearance, texture, leaf margins and moisture and light requirements.
- The impact of desertification on the lives of millions of people is worth deeper investigation. Particularly in northern Africa, vast stretches of what once was grassland has been turned to desert. Have students research the changes over time and the reasons given by scientists for those changes. Other students may wish to research the American Dust Bowl of the 1930s.
- Provide Berlese funnels and numerous soil samples for the students to observe organisms living in different soil types.
- Discuss energy pyramids and have students draw an energy pyramid using the names of plants and animals found in the grasslands biome.

Suggested Internet Resources

Periodically, Internet Resources are updated on our Web site at www.LibraryVideo.com

- www1.umn.edu/bellmuse/mnideals/prairie/build/
"Build-A-Prairie" is an excellent educational Web adventure developed by the University of Minnesota that allows students to reclaim a virtual prairie.
- www.earthfoot.org/backyard/ecology.html
The "Earthfoot" Web site is an excellent resource to begin a study of local ecology.
- www.fs.fed.us/grasslands/
"The Grasslands Story" is found on a Web site developed by the USDA that includes links to many publicly owned grasslands in the United States.

Suggested Print Resources

- Goldstein, Natalie. *Rebuilding Prairies and Forests*. Children's Press, New York, NY; 1994.
- Hirschi, Ron. *Save Our Prairies and Grasslands*. Delacorte Press, New York, NY; 1994.
- Steele, Philip. *Grasslands*. Carolrhoda, Minneapolis, MN; 1996.

TEACHER'S GUIDE CONSULTANT

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TITLES

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| • DECIDUOUS FORESTS | • MARINE ECOSYSTEMS |
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Grasslands

Grades 5–8

Students in grade 5-8 classrooms possess a wide range of background knowledge. Student response to this video program is sure to be varied, so the teachers at these grades need all the help they can get! This guide has been designed to help the 5-8 science teacher by providing a brief synopsis of the program, preview and follow-up questions, activities, vocabulary and additional resources.

Before Viewing: Extensive research tells how important it is for the teacher to discover what the students know — or think they know — about a topic, before actually starting a new unit. Therefore, after prompting discussion with the pre-viewing questions, lead your class to create an "Everything We Think We Know About..." list. You may also wish to preview key vocabulary words, and have students raise additional questions they hope will be answered.

After Viewing: Have your students share video excerpts that fascinated or surprised them, then challenge your students to prove or disprove the accuracy of the facts they put on their "Everything We Think We Know About..." list. Discuss what else they learned and use the follow-up questions and activities to inspire further discussion. Encourage students to research the topic further with the Internet and reading resources provided.

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Program Summary

Biomes are large regions of the world that have similar characteristics and are usually named for the dominant plant life in that area. Organisms that live in any given biome have features that have allowed them to adapt to the environment of that biome. Each biome has plants and animals that are uniquely qualified to survive there. The grasslands biome once covered 42% of the Earth; however, natural changes and the increasing human need for cropland have reduced this number to 12%. Grasslands are wide, relatively flat, sweeping expanses of land covered with many types of grasses. Insufficient rainfall in grasslands discourages the growth of trees and, as a result, the wind blows freely across grasslands without the natural buffer and protection that trees can provide. Climate is the determining factor in biomes. The average amount of daily sunlight, the annual amount of precipitation and the average temperature are the factors that help to shape every environment. Most of the Earth's grasslands are found in the temperate climate zone, which lies in the northern and southern hemispheres between the tropical zone around the equator, and the polar zone at the two poles. The American prairies, the pampas of Argentina, the steppes of Russia, the Serengeti in Africa — all are homes to great expanses of grass and distinctive communities of animals. Grasslands receive approximately 25 to 100 cm (10–40 in.) of precipitation annually, which is an amount that will not support tree growth.

In every biome, there is always the interaction of abiotic, or non-living and biotic, or living, factors. Abiotic factors include water, air, sunlight, minerals, soil quality, climate, wind and even fire. Fire can be a major abiotic factor in grasslands, particularly when summer heat can dry out grasses and lightning can ignite acres. Fortunately, the native plants of grasslands have adapted, having deep root systems that are not touched by the wind-blown fire, and are nourished by the ash that remains. The biotic factors include both plants and animals. Around the world, there are more than 10,000 types of native grasses. Though the diversity in animal species is lower than in some other biomes, many grasslands animals are well-adapted to burrowing in the ground for protection, a process that keeps the soil aerated, allowing for greater air and moisture content in the soil.

Drought and unwise farming techniques have been known to severely damage the balance of nature in the grasslands biome, allowing the winds to blow away the topsoil, turning the grassland into a desert. This process is called desertification. Ecologists and farmers have now discovered better planting methods and are working hard to preserve this valuable biome.

Vocabulary

The following words are included for teacher reference or for use with students. They are listed in the order in which they appear in the video.

biomes — Large regions of the world that have similar characteristics, usually named for the dominant plant life in the area. Biomes contain specific kinds of plants and animals.

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ecosystem — A place where communities of living things interact with each other and with nonliving components, such as soil and water.

grasslands — A biome described by wide, windy, sweeping expanses of relatively flat land, with many different grasses but few trees due to insufficient rainfall. The native grasses found in grasslands are relatively resistant to both fire and grazing because their leaves grow from the base, unlike most plants, in which new leaves continually grow from the branch tips. Grasslands get between 25 and 100 cm (30 to 80 inches) of rain per year.

climate — An environment's average weather conditions including temperature and rainfall. Climate is the most important element in determining what kinds of organisms can live in an area.

polar zone — The frigid areas found in bands around the North and South poles, characterized by freezing conditions, minimal sunlight, and low diversity of plant and animal life.

tropical zone — The geographic area found in a broad band around the equator, characterized by the greatest amount of sunlight and annual rainfall and the greatest diversity in plant and animal life.

temperate zone — Large areas located in the bands between the polar and tropical zones, characterized by a climate consisting of a warm season and a cold season with equal lengths.

transitional biome — A geographic area with boundaries that fluctuate due to changing environmental conditions.

abiotic factors — The nonliving components of an ecosystem such as temperature, light, water, soil and minerals.

biotic factors — All the living or once-living organisms in an ecosystem.

Berlese funnel — A funnel-shaped piece of scientific equipment with a collection container, used by environmentalists to collect organisms present in soil samples being tested.

adaptation — Changes in a living thing's structure or responses occurring over long periods of time that make the organism more fit for living in its environment.

habitat — The specific environment where a plant or animal lives; this includes physical and biological factors such as temperature, climate, light and the presence of food and shelter.

erosion — The transport of weathered materials from one location to another by wind, running water, animals or gravity.

native plant — A plant living in its natural environment.

terracing — A farming method that involves changing the contour of the land to prevent the erosion of topsoil.

desertification — The process by which grasslands change into deserts due to unwise farming techniques, drought, wind or overgrazing by animals.

ecologist — A scientist who studies the relationships among plants, animals and other organisms and their interaction with all aspects of their natural environment.

reclamation — The long-term process of restoring croplands to their original grassland state.

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sedges — Flowering herbs that look similar to grasses, usually found living near marshes and ponds.

food chain — The exchange of energy within an environment, from the sun, to plants, to herbivores, to carnivores and omnivores, and finally back to the soil, through the work of decomposers.

carnivores — Animals that eat other animals.

herbivores — Animals that eat only plants.

decomposers — Organisms that are responsible for breaking down organic matter, decomposing it into a simpler form and recycling nutrients into the soil.

aeration — The creation of passages for air and moisture in the soil by burrowing animals and soil creatures, such as prairie dogs and earthworms as they move through the soil.

Pre-viewing Discussion

Before students generate their list of "Everything We Think We Know About..." for this topic, stimulate and focus their thinking by raising these questions so that their list will better reflect the key ideas in this show:

- What kinds of animals live in grasslands?
- How are grasslands important to humans?
- How are grasslands ecosystems different from other biomes?

After the class has completed their "Everything We Think We Know About..." list, ask them what other questions they have that they hope will be answered during this program. Have students listen closely to learn if everything on their class list is accurate and to hear if any of their own questions are answered.

Focus Questions

1. What is a biome? What factors define a biome?
2. What is an ecosystem?
3. Describe the grasslands biome.
4. In which climate zone are most grasslands found? Why is that so?
5. What are the different names and locations of the world's greatest grasslands?
6. Why is the African savanna the only grassland in the world that contains a number of trees?
7. Why are grasslands called transitional biomes?
8. What is desertification?
9. What factors might be responsible for the desertification of grasslands?
10. What are some of the abiotic factors of an ecosystem?
11. What are the biotic factors of an ecosystem?
12. What happened in the 1930's that caused the American Dust Bowl?
13. Why are grasslands with native plants more resistant to desertification than grasslands converted to croplands? *(Continued)*