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NATIONAL SCIENCE EDUCATION STANDARDS

5 - 8

Life Science

Diversity of adaptations and organisms

Science in Personal and Social Perspectives

Populations, resources and environments

9 - 12

Life Science

Behavior of organisms

Science in Personal and Social Perspectives

Environmental quality
Science and technology in local, national and global challenges

*Source: *National Science Education Standards, 1996, National Academy Press*

CREDITS

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DESERT: LAND OF EXTREMES



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SYNOPSIS

Seventy percent of the earth is covered with water, while 30 percent is land. Surprisingly, deserts cover nearly 20 percent of the earth's land surface. When we think of deserts we tend to picture vast areas of dry land with temperatures so high that only a cactus or a camel can tolerate the heat. However, deserts can be found all over the world, in tropical regions and on the backsides of mountains. Each desert is unique, but all share commonalities - they are dry, windy, arid lands with little annual rainfall.

In this edition of SCIENCE SCREEN REPORT, we explore the unique and fascinating land of the desert. We uncover how they were formed and how life has adapted to living in such harsh conditions.

CURRICULUM UNITS

- BIOLOGY
- ECOLOGY
- ENVIRONMENTAL SCIENCE
- METEOROLOGY

RUNNING TIME

18:50

BACKGROUND

Deserts cover nearly 20 percent of the earth's land surface. These vast areas of windy, dry land receive very little annual rainfall, yet life has adapted to these conditions.

Many factors go into the formation of deserts. The most relevant are location and climate. Location affects the type of climate and weather patterns a desert receives. Deserts closest to the equator consist of some of the hottest temperatures, whereas those in the Polar Regions are cold. Most importantly, location determines the amount of rain a region receives each year.

With such harsh conditions it is hard to believe that life can thrive in deserts. Over time, plants and animals that make their homes in the desert have adapted to these conditions. For example, during the short time while food and water are plentiful, animals are busy reproducing. One species, the kangaroo, needs very little water to survive. In fact, kangaroos are capable of going months without drinking!

Each ecosystem has its own food chain, and the desert is no exception. Plants and seedlings are at the bottom of the food web - which relies on the rain. Insects such as termites eat plants. Lizards, spiders and centipedes feed upon the termites, and snakes, in turn, feed upon them. The food web allows the species to survive.

The great deserts of the world, like the Gobi and Sahara, were naturally formed over the years. Over time, landscapes have changed and animal and plant life has adapted. However, desert lands are disturbed by human activity, an increase in population, and grazing of livestock. All of these contribute to the deterioration of soil known as desertification. Scientists researching the deterioration of productive lands are finding that desertification may be reversible if land is managed correctly. With a combination of balance between development of the lands and respect for the surrounding environment, deserts can continue to thrive.

ADVANCED ORGANIZERS

Prior to viewing this video, students should have some understanding of the following Benchmarks for Science Literacy, Oxford University Press which are excerpted and, in some cases, abbreviated below. Refer to the Benchmarks for more information.

Benchmark 4: The Physical Setting

Section B - The Earth

Know by Grade 8

- The benefits of the earth's resources-such as fresh water, air, soil, and trees-can be reduced by using them wastefully or by deliberately or inadvertently destroying them. The atmosphere and the oceans have a limited capacity to absorb wastes and recycle materials naturally. Cleaning up polluted air, water, or soil or restoring depleted soil, forests, or fishing grounds can be very difficult and costly.

Section C - Processes That Shape the Earth

Know by Grade 8

- Human activities, such as reducing the amount of forest cover, increasing the amount and variety of chemicals released into the atmosphere, and intensive farming, have changed the earth's land, oceans, and atmosphere. Some of these changes have decreased the capacity of the environment to support some life forms.

Benchmark 5: The Living Environment

Section F - The Evolution of Life

Know by Grade 8

- Individual organisms with certain traits are more likely than others to survive and have offspring. Changes in environmental conditions can affect the survival of individual organisms and entire species.

Benchmark 8: The Designed World

Section A - Agriculture

Know by Grade 12

- Agricultural technology requires tradeoffs between increased production and environmental harm and between efficient production and social values. In the past century, agricultural technology led to a huge shift of population from farms to cities and a great change in how people live and work.

**Benchmarks can be found at www.project2061.org/tools/benchol/bolintro.htm*

CRITICAL THINKING EXERCISES

1. Illustrate or make a diorama of different desert landscapes.
2. Research different desert food webs. Choose a desert to illustrate its food web or compare/contrast varying desert food webs.
3. Choose a plant and study how it has adapted to different abiotic factors like sunlight, water, or soil.
4. Using a Venn diagram, compare and contrast the effects that El Niño and La Niña have on global weather patterns.
5. Research climate patterns in your area. How do they affect plants and animals native to your area?
6. Research the water cycle. Explain the role the water cycle has on deserts.
7. Video tape students as meteorologists as they give a weather report for different deserts.
8. Discuss desertification and have students develop a way to help manage and restore desert lands.
9. Visit the following website from Discovery School to view video clips and activities on desert animal adaptation.
<http://school.discovery.com/lessonplans/programs/deserts/index.html>

VOCABULARY

Air currents

Biomes

Desertification

Ecosystem

El Niño

Equator

Food web

Global weather patterns

La Niña

Latitude

Leeward

Meteorologist

Oasis

Polar Region

Rain shadow effect

Satellites

Solar radiation

Southern Hemisphere

CAREER POSSIBILITIES

- BIOLOGIST
- ECOLOGIST
- ENVIRONMENTAL SCIENTIST
- METEOROLOGIST