

Teaching Desert Biology

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A teaching outline, complete with references, is presented here for teaching desert biology. It is a self contained unit which teachers in the Southwest particularly can use with little change. The author's present address is Round Valley High School, Springerville-Eagar, Arizona.

The deserts of the world with their myriad of plant and animal life are centers of fascination to laymen, students, and scientists alike. Unique in their very geographical locations, desert forms exemplify the principles of ecology and biogeography.

One of the biology teacher's most challenging tasks is the correcting of misconceptions. Mistaken ideas regarding the desert are widespread; ranging from the concept of the desert as a barren, lifeless wasteland to the view wherein the desert is pictured as a dangerous land teeming with venomous reptiles and jumping cactus.

A successful study unit includes interesting and factual information, illustrations of basic principles and meaningful experiences designed to accomplish the objectives. Suggested material, activities, and references are presented as resources to assist the teacher in providing a successful unit.

Objectives

1. To develop an appreciation and respect for all life.
2. To gain an understanding of ecology and biotic interrelationships.
3. To learn safety procedures against the dangers of the desert.
4. To acquire correct concepts regarding desert geology, geography, botany, and zoology.
5. To realize the economic potential of desert areas.

Subject Matter Outline

I. The Desert Environment

A. Definitions

1. environment
2. organism
3. ecology

4. desert
5. biogeography

B. Characteristics

1. geological formation
2. weather
3. climate
4. soils

C. Deserts of the World

1. Asiatic Deserts
2. African Deserts
 - a. Sahara
 - b. Kalahari
3. Australian Deserts
4. South American Deserts
 - a. Atacama
 - b. Patagonian
5. North American Deserts
 - a. Great Basin
 - b. Mojave
 - c. Chihuahuan
 - d. Sonoran

II. Sonoran Desert Plants

A. Small Plants

1. Lichens
2. Desert Grasses
3. Sagebrush
4. Desert Flowers
5. Desert Shrubs

B. Cactus and Cactus-like Plants

1. Prickly Pear
2. Cholla
3. Saguaro
4. Night Blooming Cereus
5. Barrel
6. Yuccas
7. Century Plant
8. Ocotillo

C. Trees

1. Palo Verde
2. Mesquite
3. Ironwood

III. Sonoran Desert Animals

- A. Invertebrates
 1. Centipede
 2. Millepede
 3. Scorpions
 4. Spiders
 5. Insects
 6. Vinegaroon
 7. Solpugid
- B. Desert Amphibia
- C. Desert Reptiles
 1. Non-Venomous Snakes and Lizards
 2. Horned (Toad) Lizard
 3. Rattlesnakes
 4. Coral Snake
 5. Desert Tortoise
 6. Gila Monster Lizard
- D. Desert Birds
 1. Gila Woodpecker
 2. Cactus Wren
 3. Elf Owl
 4. Roadrunner
 5. Gambel's Quail
 6. Hawks
 7. Doves
- E. Desert Mammals
 1. Mule Deer, Pronghorn Antelope
 2. Javalina
 3. Jackrabbits, Cottontails
 4. Bobcat, Cougar, Jaguar
 5. Bighorn Sheep
 6. Gray Wolf, Coyote, Foxes
 7. Rodents, Squirrels
 8. Ringtail
 9. Coati
 10. Badger
 11. Skunks
 12. Porcupine
 13. Bats

IV. Biotic Interrelationships—Examples (Classification after Stahnke, 1961)

- A. Relations between Living and Non-Living
 1. Weather—Behavior of nocturnal animals
 2. Water—Kangaroo Rat's mechanism for obtaining water
 3. Soil—Adaptations of soil-living animals
- B. Relations between Living and Living
 1. Sexual—Scorpion's reproductive mechanism

2. Threptic—Tarantula's preparing of the Pepsis Wasp as food for expected offspring
3. Social—Community sharing a cactus home
4. Symbiosis
 - a. Mutualism—Lichens
 - b. Commensalism—Elf Owl nesting in cactus
 - c. Parasitism—Mistletoe growing on tree
5. Scavenger—Buzzard feeding on carrion
6. Predatory—Hawk catching and feeding on rodent
7. Economic—Human bitten by rattlesnake

V. Man and the Desert

- A. Values
 1. Agriculture
 2. Esthetic
 3. Direct Food Sources
 4. Healthful Climate
- B. Dangers
 1. Extreme temperatures
 2. Lack of water
 3. Thorny and poisonous plants
 4. Venomous animals
- C. Desert Survival
 1. Prevention of dehydration
 2. Locating and purifying water
 3. Fires and shelter
 4. Travel and navigation
 5. Identification of poisonous plants and animals
 6. Edible Plants
 - a. Identification
 - b. Preparation as food
 7. Edible Animals
 - a. Identification
 - b. Trapping
 - c. Preparation as food
 8. First Aid Measures

*Selected Resources**Booklist Sources*

1. University bookstores in Arizona, California, Nevada, New Mexico, and Texas
2. Southwestern Monuments Association, Box 1562-A Gila Pueblo, Globe, Arizona.

3. Desert Magazine Bookshop, Palm Desert, California.

Organizations

1. Arizona-Sonora Desert Museum, Inc., Box 5602, Tucson, Arizona.
2. Arizona Zoological Society, Box 7282, Phoenix 11, Arizona.
3. Desert Botanical Garden, Box 547, Tempe, Arizona.
4. Poisonous Animals Research Laboratory, Life Science Center, Arizona State Univ., Tempe, Arizona.

Pamphlets

Each organization listed above issues pamphlets some of which include desert topics. In addition:

- Arizona—Its Place in Time. 1961. The Arizona Republic, Phoenix, Arizona.
- Desert Survival. 1960. Maricopa-County-City-of-Phoenix Civil Defense Joint Council, 2035 N. 52nd Street, Phoenix, Arizona
- Game Bulletins, State Game Commissions, Southwestern States.

Lantern Slide Sources

An excellent assortment of desert subjects can be obtained by using a variety of sources, such as:

- Arizona Highways, Phoenix, Arizona. Request *Color Classics* catalog.
- Scientific Supplies Co., 600 Spokane St., Seattle 4, Washington. Request *Full Color Biology Slides* catalog plus supplemental list, *Lower Sonoran Zone*.
- Southwestern Monuments Assoc., Box 1562-A Gila Pueblo, Globe, Arizona. Request *Catalog of Slides*.
- Carolina Biological Supply Co., Elon College, N. C. Request catalog of *Biological Materials*.
- General Biological Supply House, Inc., 8200 South Hoyne Ave., Chicago 20, Ill. Request *Turtlox Biology Catalog*.
- Desert Botanical Garden, Box 547, Tempe, Arizona. Request *Color Transparencies List*.

Films

- Cactus Wren. 1952. Arthur Barr Assoc.
- Creatures of the Desert. 1957. Young America Films.
- Desert, The. 1947. Arthur Barr Assoc.
- Desert Conquest. 1950. Salt River Valley Users Assoc.
- Desert Demons. 1932. Teaching Film Custodians.
- Desert People. 1949. U. S. Indian Service.
- Kangaroo Rat. 1939. Arthur Barr Assoc.
- Life in Hot, Dry Lands. 1949. Coronet.
- Life in the Desert. 1954. Encyclopaedia Britannica Films.
- Life in the Sahara. 1953. Encyclopaedia Britannica Films.
- Living Desert. 1952. Walt Disney Productions.
- Wildlife of the Desert. 1948. Bailey Films, Inc.
- What Makes a Desert? 1949. Young America Films.

Specimens

Living and preserved specimens of most desert flora and fauna are obtainable from the larger biological supply houses. *Caution!* Before collecting specimens on desert field trips, clear with the authorities regarding collection of wildlife within the state. Collectors are often surprised to learn that they are breaking state laws. For example, Arizona protects Gila Monsters and Horned Lizards and forbids possession of them without a license.

References

- Jaeger, Edward. 1957. *The North American Deserts*. Stanford Univ. Press, Stanford, California.
- Judd, B. Ira, Coordinator. 1950. *Natural Resources of Arizona*. Arizona Conservation Club, Inc., Tempe, Arizona.
- Kearney, Thomas, and Robert Pebbles. 1960. *Arizona Flora*. University of California Press, Berkeley, California.
- Life (The Editors of) *Nature Library*. 1961. *The Desert*. Time, Inc., New York.
- Stahnke, Herbert L. 1961. *Biotic Principles*. Charles E. Merrill Co., Columbus, Ohio.