



# *Creatures of the Night*

A forty five minute science program

## **To the Teacher:**

Thank you for making the *Creatures of the Night* program a part of your curriculum. During this exciting interactive educational program, students will meet live Sonoran Desert animals, look at cool bio-facts, and maybe end up looking like a nocturnal creature! If possible, it would be helpful to have a room that can be made dark easily by turning out lights and adjusting window shades.

This packet contains pre- and post- program information and activities along with a vocabulary list and suggested resources. These materials were developed to help you extend this class topic with both introductory and follow-up lessons. The pre-visit information will introduce students to some of the basic concepts covered in *Creatures of the Night* and help prepare them for the program. We hope you'll find this information useful and easy to incorporate into your science curriculum. For more information about the Desert Museum and the Sonoran Desert, visit our website at [www.desertmuseum.org](http://www.desertmuseum.org).

We look forward to working with you and your students.

Sincerely,  
ASDM Center for Sonoran Desert Studies  
Education Department

## **CLASS OBJECTIVES**

Through the examination of live animals, artifacts and interactive demonstrations students will:

- Develop an understanding of the physical characteristics of a desert and how nocturnal life is an adaptation for desert survival .
- Understand the challenges and conditions posed by nocturnal living .
- Describe animal adaptations to nocturnal living that help them survive.
- Develop an appreciation for a diverse group of Sonoran Desert wildlife.
- Identify some ways humans impact life in the Sonoran Desert and measures that are being taken to conserve and protect it.

## ARIZONA ACADEMIC STANDARDS IN SCIENCE CORRELATION

The Creatures of the Night program and supplemental activities correlate to these Arizona Academic Science Standards. See each activity for specific standards and performance objectives.

SC03-S4C3-01&04, SC04-S4C4-02, SC03-S4C3-05, SC05-S1C4-02, SC05-S1C3-01, SC04-S1C2-02,03,04&05, SC05-S3C1-02, SC03-S3C1-01&02, SC03-S4C3-01&04, SC04-S4C4-02, SC03-S4C3-05, SC04-S6C3-01&02

### Science Standards:

#### Strand 1: Inquiry Process

Concept 1: Observations, Questions, and Hypothesis

Concept 2: Scientific Testing

Concept 3: Analysis and Conclusions

Concept 4: Communication

#### Strand 2: History and Nature of Science

Concept 1: History of Science as a Human Endeavor

Concept 2: Nature of Scientific Knowledge

#### Strand 3: Science in Personal and Social Perspectives

Concept 1: Changes in Environment

Concept 2: Science and Technology in Society

Concept 3: Human Population Characteristics

#### Strand 4: Life Science

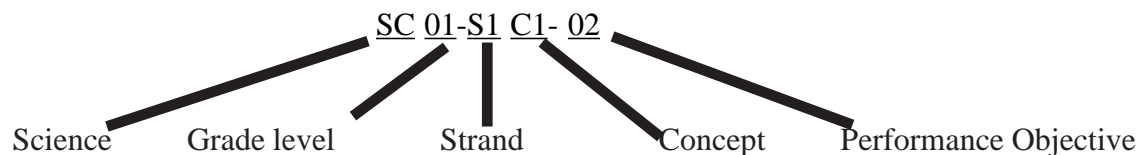
Concept 1: Characteristics of Organisms

Concept 2: Life Cycles

Concept 3: Organisms and Environments

Concept 4: Diversity, Adaptation and Behavior

The shorthand for each standard is read this way:



## RESOURCES

### Literature:

- Arizona-Sonora Desert Museum: *A Natural History of the Sonoran Desert*. Tucson: ASDM Press, 1999.
- Braus, J., ed. Ranger Rick's Nature Scope: *Discovering Deserts*. Washington D.C.: National Wildlife Federation, 1985. (For ordering information call: 1-800-722-4726)
- Cannon, Janell. *Stellaluna*. New York: Harcourt Brace & Company, 1993.
- Greenaway, Frank. *Amazing Bats*. New York: Alfred A. Knopf, 1991.
- Tuttle, Merlin D. *Discover Bats!*. Bat Conservation International, Austin. 1998.
- *About Bats: Educator's Activity Book*. Bat Conservation International, Austin, 1991.
- Whalley, Paul. *Eyewitness Butterfly and Moth*. New York: Alfred A. Knopf, 1988.
- Wiewandt, Thomas. *The Hidden Life of the Desert*. New York: Crown Publishers, 1990.
- *Zoobooks: Bats*. Wildlife Education Ltd, San Diego, September 1994.

### Organizations:

- **Arizona-Sonora Desert Museum**: 2021 N. Kinney Rd., Tucson, AZ 85743. Phone: (520) 883-3025. [www.desertmuseum.org](http://www.desertmuseum.org)
- **Bat Conservation International, Inc.**: P.O. Box 162603, Austin, TX, 78716. Phone: 1-800-538-2287. Website: [www.batcon.org](http://www.batcon.org)
- **Desert USA**: [www.desertusa.com/animal.html](http://www.desertusa.com/animal.html) [This site contains information on many nocturnal desert creatures, including photos.]
- **Journey North Signs of Spring Everywhere**: [www.learner.org/jnorth/search](http://www.learner.org/jnorth/search)
- **NASA, GSFC, USGS, NBII, MU-SPIN collaboration**: "The Adventures of Echo the Bat" story introduces the use of remote sensing to study big brown bat migration in Arizona. <http://science.hq.nasa.gov/kids/imagers/story.html>

## VOCABULARY

**Adaptation** - Special body features or behaviors that help a creature survive in its environment (i.e. an eagle has sharp talons that help it grab and hold its prey.)

**Antennae** - Jointed appendages on the heads of many insects and arthropods used for sensory perception. For example, moths use their antennae to detect scents or pheromones produced by other moths.

**Celestial navigation** - The use of the moon and stars for nighttime orientation. It has been shown that many migratory birds and some insects use celestial navigation to stay on course during their flights.

**Diurnal** - Active during the day.

**Echolocation** - The use of reflected sound from an emitter (such as a bat or dolphin) to locate objects.

**Endangered** - An animal or plant that is so rare it may become extinct.

**Endangered Species** - A listing given by the U.S. Fish and Wildlife Service to species of plants and animals whose populations (numbers) have dropped so low that they are in danger of becoming extinct.

**Evaporation** - Changing from a liquid to a gas.

**Habitat** - The place in which an animal or plant lives that provides the food, water, shelter, and space needed for its survival.

**Migrate** - To travel from one area to another in search of resources to support feeding and reproduction.

**Nocturnal** - Active at night.

**Pollination** - The spreading of pollen from the male parts of one flower to the female parts of another flower of the same kind, resulting in the production of seeds and fruits.

**Pollinator** - An animal that carries pollen from one flower to another, aiding in pollination.

**Venom** - A biologically produced toxic substance injected into prey to subdue it.

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## PRE-PROGRAM INFORMATION AND ACTIVITIES

### Teacher Background Information: A LOOK AT THE SONORAN DESERT

This short reading provides you with some background information on the Sonoran Desert Region and an introduction to the topic of your outreach program.

### THE SONORAN DESERT

Orient students to the geographic location of the Sonoran Desert and characteristics of desert environments, plants, and animals.

### NOCTURNAL NAVIGATORS

Students explore unique strategies of nocturnal animals for making a living in the dark.

## POST-PROGRAM INFORMATION AND ACTIVITIES

### NOCTURNAL KNOWLEDGE

Students work in research groups to describe adaptations for night living of the animals presented in the Creatures of the Night program.

### BATS: NEED NECTAR, WILL TRAVEL

Students play the role of nectar feeding bats on their annual migration and try to avoid the different hazards that hinder their progress.

### NIGHT CREATURES CROSSWORD PUZZLE

As a wrap-up to your studies of nocturnal creatures, pass out a copy of this crossword to each student.

ANSWERS:

#### Across

1. cooler 3. migrate 5. bats 7. pollinators 9. smell 11. kangaroo rat 13. moon 14. bark  
15. white 16. venom 17. pallid

#### Down

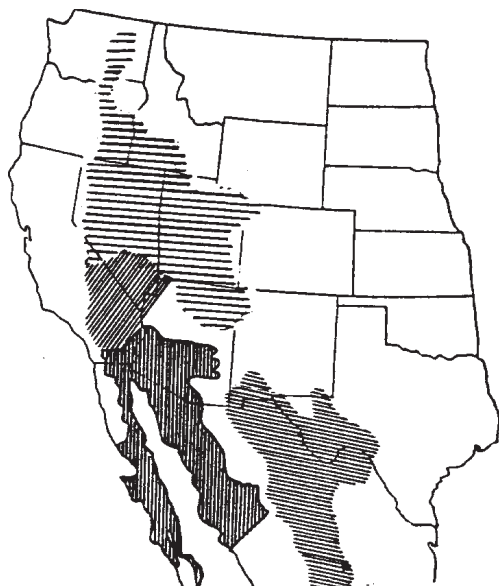
1. caterpillars 2. insects 3. moths 4. elf 6. owls 8. nocturnal 9. scorpions 10. backs 12. great

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## A LOOK AT THE SONORAN DESERT

Background Information for Teachers



#### Major North American Deserts

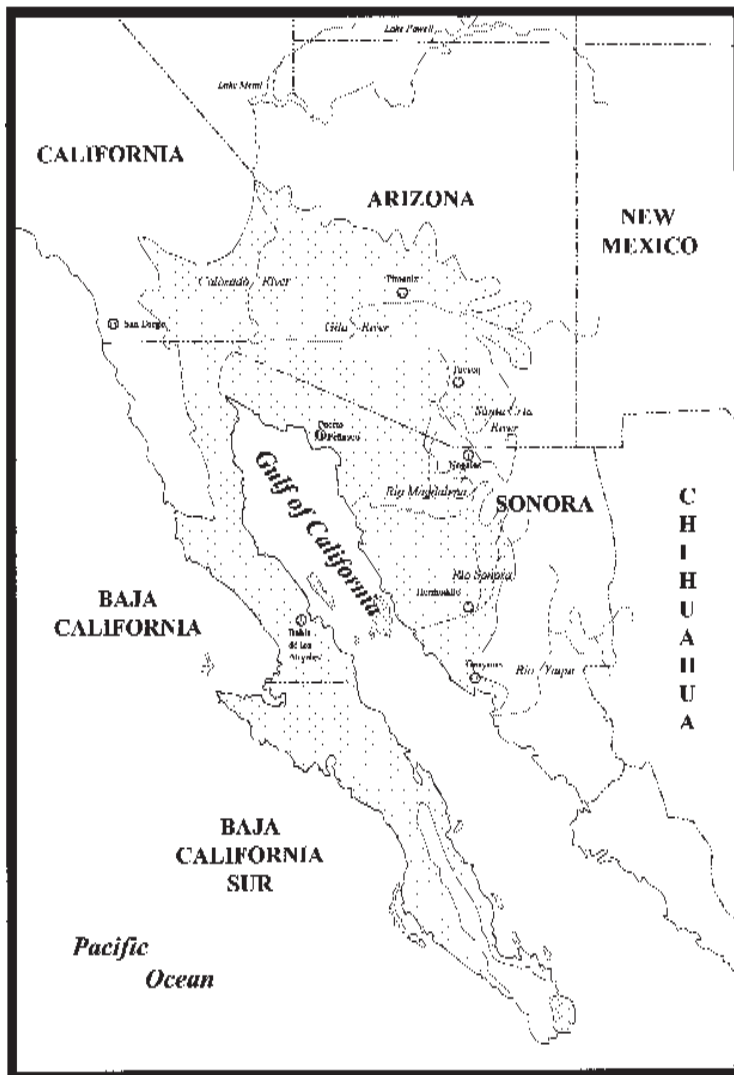
-  Great Basin Desert
-  Mojave Desert
-  Sonoran Desert
-  Chihuahuan Desert

The Arizona-Sonora Desert Museum is located in the Sonoran Desert. This desert is one of four that occur in North America. The other three are the Great Basin, Mojave and Chihuahuan deserts. Arizona is the only state in which all four deserts can be found.

## What Is A Desert?

All deserts share a common factor – they are dry! Little rain falls in the desert, often less than 10 inches per year. The rain that does fall may come in sudden large bursts from a violent desert thunderstorm. Much of this water runs off the soil into washes or evaporates before it has a chance to soak into the ground. This leaves little water for plants and animals.

Other characteristics of deserts include windy conditions, intense sunlight, unpredictable and changing amounts of annual rainfall, and great differences between day and night temperatures (days may be hot, but nights may be much cooler).



### The Sonoran Desert

The Sonoran Desert, for the most part, is a low, hot desert. Parts of this desert get less than 3 inches of rain a year! Winters are mild and summers are hot. Summer-time temperatures may reach 120°F. Tucson and the area surrounding the Arizona-Sonora Desert Museum get an average of 11.4 inches of precipitation per year. Rainy seasons vary throughout the desert, but in our area, the rainy seasons usually come twice a year, in the late summer and winter.

The Sonoran Desert is quite lush when compared to other deserts of the world. It contains over 2,000 different species of flowering plants alone. *Columnar* cacti (such as saguaro and organ pipe) and *legume* trees (such as mesquite, palo verde, acacia) visually dominate the landscape.

*The Arizona-Sonora Desert Museum is an excellent place to visit to learn more about the natural history of this fascinating region. The Desert Museum displays only the plants and animals of the Sonoran Desert Region. This region includes the desert itself and the non-desert communities found next to – or within – the desert. These other communities include riparian corridors (lush areas along streams), pine-topped mountain islands, and desert grasslands.*

## *Creatures of the Night program*

There are many different kinds of plants and animals in the Sonoran Desert. Life thrives here because organisms are adapted to survive the lack of water and hot summer days typical of the desert environment. While plants like saguaro cacti and palo verde trees must withstand these conditions day after day, many desert animals have learned to avoid them altogether. They spend the day at rest in deep shade or in underground burrows, emerging in the cooler hours of evening, night, or early morning. **Nocturnal** living is a behavioral **adaptation** that allows many desert animals to protect precious body moisture and prevent overheating.

Nocturnal animals have a variety of adaptations that enable them to be active in the dark. Many have excellent night vision. Owls, for example, have large eyes that let them utilize even the dimmest moonlight or starlight. Many mammals have a “mirror” in the back of the eye called a tapetum that reflects light back into the eye and helps them see better in the dark. Other nocturnal animals rely on acute hearing to help them find prey or warn them of predators. One example, the kangaroo rat, has such good hearing it can detect the silent wingbeats of an owl. Still other night creatures have a highly developed sense of smell. Snakes are able to detect prey by smelling and tasting the air with their forked tongues. They also detect vibrations through bones in their jaw. Many other night creatures like scorpions and tarantulas use hairs to detect vibrations.

In this program, students will identify nocturnal life as one strategy for desert survival. They will explore the challenges posed by a nocturnal existence and discover the unique adaptations that help some Sonoran Desert animals make a living in the night world.

