



ARIZONA-SONORA
**DESERT
MUSEUM**

Amazing Arthropods

A forty five minute Desert Discovery Class

TO THE TEACHER:

Thank you for making the *Amazing Arthropods* Desert Discovery Class a part of your curriculum. During this exciting educational program, students will see live desert animals, handle artifacts, and perhaps serve as a volunteer for a program demonstration.

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 presented in *Amazing Arthropods* and help prepare them for the class. 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.

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:

- Describe features used to classify arthropods.
- Identify organisms from the five classes of arthropods.
- Develop an appreciation for a diverse group of Sonoran Desert arthropods.
- Explain the importance of arthropods in living systems and reasons to promote their conservation.

ARIZONA ACADEMIC STANDARDS IN SCIENCE CORRELATION

The Amazing Arthropods program and supplemental activities correlate to these Arizona Academic Science Standards. See each activity for specific standards and performance objectives

SC03-S3C1-01&02, SC01-S4C3-03, SC03-S4C3-04, SC02-S4C2-03, SC04-S4C1-01, SC03-S4C4-01&03, SC04-S4C1-02, SC03-S4C3-01&04, SC04-S1C2-02,03&04, SC06-S1C1-01, SC06-S1C2-02, SC04-S1C1-03, SC04-S1C4-01&02

Science Standards:

Strand 1: Inquiry Process

- Concept 1: Observations, Questions, and Hypotheses
- 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

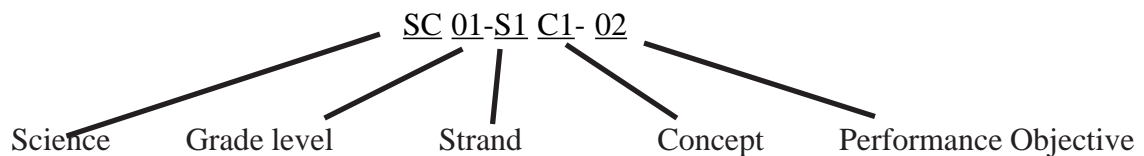
Strand 3: Science in Personal and Social Perspectives

- 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

Activities:

- Braus, J., ed. Ranger Rick's NatureScope: *Incredible Insects*. Washington D.C.: National Wildlife Federation, 1984, 1989. (For ordering information call: 1-800-722-4726)
- Council for Environmental Education. *Project WILD Elementary Activity Guide*. U.S.A., 1983, 1985, pp. 197-200.
- Hinman, Laurie A. "What's the Buzz? A classroom simulation teaches students about life in the hive." *Science and Children*. February, 2000.
- Lazaroff, David W., editor. *Dr. Strangeplant*. Tucson: Tucson Audubon Society. 1991.
- Pascoe, Elaine. *Crickets and Grasshoppers*. Woodbridge, CT: Blackbirch Press. 1999.
- Roche, Robin K. *Dyeing with Cochineal*. Tucson, 1997.

On-line Curriculum and Information:

- **Desert USA:** www.desertusa.com/animal.html This site contains information on many desert animals, including arthropods.
- **Mosquito Site.** <http://www.desert-mosquito.org/> Developed by a graduate student in Agriculture at the University of Arizona, this site provides information on mosquitos in our region for teachers and children. It also provides links to a wide range of entomology curricula for grades K-12, as well as general entomology sites for kids.
- **Using Live Insects in Elementary Classrooms for Early Lessons in Life.** <http://insected.arizona.edu> Developed by the Center for Insect Science Education Office at the University of Arizona, this curriculum is a program dedicated to introducing health topics to children in kindergarten through third grade. The result is a printable collection of twenty integrated lessons with science and math activities that use live insects. The lessons are aligned with National Science Education Standards. Also available in hard copy.

Organizations:

- **Arizona-Sonora Desert Museum:** 2021 N. Kinney Rd., Tucson, AZ 85743. Phone: (520) 883-3025. www.desertmuseum.org [Visit our arthropod display in the Reptile Room. Many of our docent interpretations on grounds involve live arthropods and their products.]
- **Project WILD:** Contact Sandy Reith, Project WILD Coordinator, Arizona Game & Fish Department, 2221 West Greenway, Phoenix, AZ 85023, (602) 789-3243 for more information on Project WILD in the state.
- **Sonoran Arthropod Studies Institute (SASI):** P.O. Box 5624, Tucson, AZ 85703. (520) 883-3945. <http://www.sasionline.org/> SASI is a non-profit environmental and science education organization that studies and interprets the vital roles arthropods play in the Sonoran Desert. They offer a variety of outreach programs (K-5), teacher resources, and two publications, *Backyard BUGwatching* and *the instar*.

Supplies:

- **Ant Colonies** available occasionally to Tucson area teachers to raise in classrooms. Contact Diana Wheeler at (520) 621-3273 for more information.
- **Local pet stores and bait stores** (crickets, mealworm larvae)
- **ARBICO (Arizona Biological Control, Inc.)** P.O. Box 4247 CRB, Tucson, AZ 85738 (800) 825-9785. (ladybird beetles - larvae and adults - and praying mantid egg cases)
- **Carolina Biological Supply Company**, Biology/Science Materials, Burlington, NC, 27215. (800) 334-5551. (ants, crickets - nymphs and adults, isopods, ladybird beetles, mealworm larvae, milkweed bugs - eggs and adults, mosquitos, praying mantid egg cases, silkworm eggs)
- **University of Arizona Entomology Collection.** Loans of specimens, curriculum information, occasional speakers. Contact Carl Olson at (520) 621-5925 for more information.

VOCABULARY

Abdomen - The last body region of an insect. It contains most of the internal organs.

Antennae - A pair of sensory organs on the head of an insect used for taste, smell, touch, and communication.

Arachnid - An arthropod with no wings, no antennae, one or two body segments, and eight legs.

Arthropod - An animal with jointed legs, an exoskeleton, and a segmented body.

Centipede - An arthropod with no wings, one pair of antennae, and a flat body with many segments and a pair of legs attached to each segment.

Chrysalis - The pupal case of many butterflies.

Cocoon - The pupal case of many moths, made out of silk.

Colony - A group of individuals with common characteristics.

Complete metamorphosis - The process of change in advanced insects from egg to larva to pupa to adult.

Crustacean - An arthropod with no wings, two pairs of antennae, two body segments, and ten or more legs.

Decomposer - An organism that breaks down dead plant and animal materials into their chemical components through the process of decay. Examples: mushrooms and other fungi, millipedes.

Exoskeleton - The hard outer skeleton of an arthropod that protects and supports the internal organs, muscles, and other tissues.

Food chain - A group of plants and animals in a natural community through which energy flows in the form of food.

Incomplete metamorphosis - Also known as “simple” metamorphosis. The insect goes through three life stages: egg to nymph to adult.

Insect - An arthropod that has one or two pairs of wings, one pair of antennae, three body segments, and three pairs of legs.

Larva - (plural larvae) The immature stage of an insect that undergoes complete metamorphosis. Larvae are quite different from adults, i.e. caterpillars are the larvae of moths and butterflies and maggots are fly larvae.

Metamorphosis - The process of changing from egg to adult.

Millipede - An arthropod with no wings, one pair of antennae, a round body with many body segments, and two pairs of legs on each segment.

Molt - To shed the exoskeleton or outer skin.

Nymph - The immature form of an insect that undergoes incomplete metamorphosis. Nymphs are similar to adults in diet and behavior but are sexually immature, wingless, and smaller.

Pesticides - Chemicals used to kill insects.

Pollinate - To spread pollen from the male parts to the female parts of a flower, resulting in the production of seeds and fruits.

Pupa - The inactive stage of an insect undergoing complete metamorphosis in which a larva changes into an adult.

Thorax - The middle of the three body parts of an insect to which the legs and wings are attached.

PROGRAM INFORMATION AND ACTIVITIES

AMAZING ARTHROPODS

This activity introduces students to the characteristics, diversity, adaptations, and important roles of some Sonoran Desert arthropods.

UNIDENTIFIED (FLYING?) ARTHROPODS

Students identify the features that distinguish the five different classes of arthropods and observe arthropod pictures or specimens to determine the class to which they belong.