

WHAT'S THE BUZZ ON NATIVE BEES?

Students learn about the diversity of native solitary bees and ways to attract these important pollinators to the schoolyard or desert garden.

ARIZONA SCIENCE

STANDARDS

SC01-S1C1-02,
SC00-S4C3-02,
SC01-S4C1-03,
SC03-S4C3-03&04

OBJECTIVES

Students should:

- Describe different types of bees native to the Sonoran Desert.
- Identify the nesting and feeding requirements of a variety of these desert pollinators.

MATERIALS

- A copy of *Student Handout - What's the Buzz on Native Bees?* for each student.
- Crayons, markers, or colored pencils
- Pictures of native bees. (optional)
- Samples or pictures of the nests of native bees. (optional)

VOCABULARY

Metamorphosis
Native
Solitary
Swarm

BACKGROUND

The familiar honey bee isn't the only bee that will be visiting the flowers in your desert garden. More than 1,000 different kinds of bees are native to the Sonoran Desert Region! In fact, the desert around Tucson has more species of **native** bees than almost anywhere else in the world. With careful observation, you and your students may notice giant, black carpenter bees; fuzzy, black and yellow bumblebees; metallic, green sweat bees; dull, blue mason bees; and the smallest bee in the world, *Perdita minima*, which is about the size of this "I." (see *Student Handout - What's the Buzz on Native Bees?*) These native bees are not just searching for nectar and pollen, but also for water and safe places to lay their eggs. By providing nest sites and water sources, you and your students can entice these important native pollinators to make your schoolyard or desert garden their home.

GETTING READY

Make a copy of *Student Handout - What's the Buzz on Native Bees?* for each student. Prepare the materials listed in the column on the left of this page.

DOING THE ACTIVITY

SETTING THE STAGE

- 1) Ask the students, "How many of you have seen a honeybee? Have you ever seen a bee that looked different from a honeybee?" (Many will have seen giant, black carpenter bees or large, fuzzy, black and yellow bumblebees.) Explain that there are more than 1,000 different kinds of bees native to the Sonoran Desert and that many of them may visit the flowers in your schoolyard or desert garden looking for nectar and pollen.
- 2) Ask, "What kind of shelters do honeybees make? What do they do there?" (Most students know that honeybees build a large nest that can survive for

many years producing a surplus of honey that people and sometimes animals can collect and eat.) Ask, "Why do bees need to make nests?" (To have a safe place to lay their eggs. These eggs will hatch into larva and then go through **metamorphosis** to develop into an adult bee.) Tell the students that honey bees are not native to North America but were brought here by settlers from Europe 350 years ago. Explain that our native bees live in ways very different from honeybees and use a variety of shelters or nests to protect their eggs.

LEARNING COMMON NATIVE BEES

- 1) Give each student a copy of *Student Handout - What's the Buzz on Native Bees?* Tell your students that the handout shows examples of common native bees and their nests. Explain that most native bees are **solitary**. Ask, "What kind of nest do you think a solitary bee makes? What kind of food does it eat?" Tell the students that solitary bees don't make hives. Each female bee builds its own nest and collects nectar and pollen to feed itself and to provide food for its own larvae. (See **Can you Believe it?** on the following page for more information about native bees.)
- 2) Read the clues about each bee and its nesting requirements with your students.
 - a. Have students color the bees as indicated on the handout.
 - b. Ask, "Which bee is not native to the Americas?" Tell students to put an X next to that bee.
 - c. Ask, "Which bees are solitary nesters?" Tell students to circle those bees and fill in the blank with the letter of the correct nest type.(See *Teacher Answer Sheet*.)
- 3) Ask your students, "What do flowers do for native bees?" (give food in the form of nectar and pollen.) "What do the native bees do for the flowers?" (polli-

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RESOURCES

- Alternative Pollinators: Native Bees, www.attra.org/attra-pub/nativebee.html
- Bee Biology and Systematics Laboratory, www.loganbeelab.usu.edu/bee-gall.html
- An Introduction to the Solitary Bees, www.earthlife.net/insects/solbees.html
- The Bee Works, (520) 888-7422, www.thebeeworks.com
- ASDM Forgotten Pollinators Campaign, www.desertmuseum.org/fp
- Jonesville Paper Tube Corporation, www.papertube.com

nate them. Flowers cannot produce seeds unless they have been pollinated.) Bees are the primary pollinators of many native plants, wildflowers, and crops. This important relationship between bees and plants provides people with many of the fruits and seeds we love to eat, the cotton clothes we wear, and even some of the medicines we need!

EXTENSIONS

BECOMING BEE RANCHERS

You and your students can attract a variety of native bees to your schoolyard or desert garden by creating a few different kinds of nesting sites.

- 1) **Leafcutter**, **mason**, and other native bees may take up residence in wooden blocks drilled with holes. Cut a 4" x 4" piece of untreated pine into 6" lengths. Drill a variety of 1/8" to 5/16" holes 4-5" deep lengthwise into the block. Hang the blocks in a shady spot near your garden or other flowering plants. Try lining some of the holes with paper tubes. (See resource list.) You can remove a few of

the tubes that bees have nested in and cut them open to show your students the developing bee larvae inside.

- 2) Leave a bare patch of soil near your garden to attract **digger bees**. Keep it dry and away from foot traffic.
- 3) Try stacking dead branches or agave stalks against a fence or wall to attract **carpenter bees**.
- 4) **Mason bees** need mud to complete their nests. Provide a muddy spot in your school yard by piercing the bottom corner of an empty plastic gallon jug with a straight pin. Fill with water, replace the cap, and use twine to tie the handle to a fence or hang in a suitable location. Allow the water to drip out on bare ground and refill jug as needed. A variety of bees, butterflies and other wildlife may also visit your puddle for a drink!

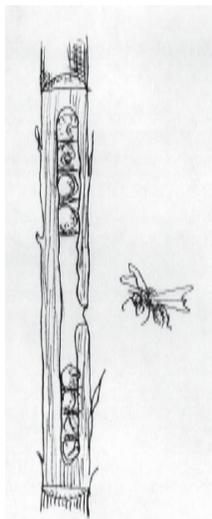
To learn more about techniques for attracting native bees and other pollinators, check the resources listed in the column at the left and visit the *Pollination Garden* at the Arizona-Sonora Desert Museum.

Can you Believe it?

Unlike the honeybee, most of our native bees are solitary nesters. Each female mates and builds its own small nest of about 10 compartments, then she lays a single egg in each compartment and provides it with its own store of pollen. When the egg hatches, this pollen provides the bee larva with an ample food supply while it completes metamorphosis.

Some solitary bees can make their own nests by drilling into dead wood or agave stalks, others need to find tunnels abandoned by burrowing beetles. Most solitary bees dig their nests underground, sometimes in large aggregations of many thousands of bees, all acting independently.

Solitary bees do not cooperate with other females in building or defending their nest or young or with collect-



ing pollen or other floral resources. Each solitary bee is a "single mom" so she cannot afford to lose the opportunity to reproduce by being aggressive. In fact, solitary bees are considered docile, rarely sting unless handled or swatted and do not **swarm**.

One familiar native bee, the **bumblebee**, is not solitary and makes a small nest, usually underground in an abandoned rodent burrow. In the spring, a fertilized female will come out of hibernation, look for a suitable site, and lay her first batch of eggs. She is kept very busy collecting food for the larvae after the eggs have hatched and until the young are old enough to fly. Then her offspring will do the foraging for their sisters while the queen lays fertilized eggs throughout the summer. These colonies rarely have more than a few hundred bees working together. At the end of the summer, the queen lays a few unfertilized eggs that hatch into males who mate with some of the females. Soon, the rest of the bumblebees die and only the fertilized females are left alive to hibernate through winter and start the cycle again the following spring.