Bees: Fantastic Farmers

Activities for children and adults that build upon PlayTrail experiences outdoors

playtrails®

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Getting children comfortable in the outdoors may be one of the greatest gifts we can offer the next generation. Given what we know about the physical and psychological consequences of a sedentary, electronic media-dominated lifestyle, it also might be one of greatest health tips we can offer. A childhood rich in outdoor experiences provides an inexpensive antidote for a number of medical problems, including depression, attention deficit disorder, and obesity.

But there is more. Letting young children freely explore their world outdoors can instill a lifelong connection to the environment. It can also help cultivate an ethic of caring for the environment.

The role of adults in this process focuses less on teaching and more on coaching. While most children want to explore their world, some may be hesitant or even fearful. Parents and other caregivers need to be there to offer encouragement and guidance without stifling the important work called play.

Tips for adults

We offer the following tips to help make the most of your PlayTrail explorations.

1. Find activities in these booklets that are appropriate for your child's age and interests, as well as environments that are readily accessible to you.
2. Share the booklet with your child in advance.
3. Let your child initiate the exploration, but be ready to offer suggestions in the event encouragement is needed. Consider the booklet's investigations to be jumping-off points that pique curiosity.
4. Avoid the tendency to teach. Share the information you glean from these booklets as "incidental" points of interest.
5. Model positive behaviors and respectful attitudes toward nature.
6. Respect your child's fears. Never force a child to touch something they do not want to touch. Courage and interest come about through positive, graduated experiences.
7. Foster play and accept the fact that dirty hands, mud-caked shoes, and wet clothes often come with it.
8. Avoid the tendency to "helicopter." Too often we over-protect and stifle explorations inadvertently.

Fantastic Farmers

Some bees are solitary and others are social. Those that are social live in a community called a hive where each bee has a specific job, depending on what they are: queen, worker, or drone. With honey bees, the queen's sole job is to lay eggs. Fed a special food called royal jelly, she can lay over a thousand eggs in a day! Short-lived male drones have no job other than to mate with young queens.

Workers are sterile females. Their jobs change over their life. They are the foragers and farmers for the hive. They are also the queen's maids and nurses, as well as the hive's factory workers, honey producers, construction teams, guards, and janitors.

The workers that forage are older and more experienced. Their task is to gather pollen and nectar. They fly from flower to flower, eventually returning to the hive with pollen baskets full of pollen and a stomach (crop) full of nectar.

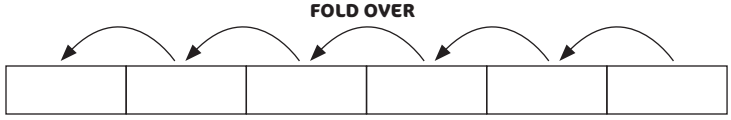
Back in the hive, the nectar passes from one worker to another. As it does, it mixes with saliva, loses some water, and changes into honey. The honey is placed in a storage cell, or honeycomb, and fanned by other teams of workers to speed the rate of evaporation and cause the honey to thicken. As for the pollen, it is mixed with honey to form protein-rich beebread—the main source of food for most adults and larvae.

Hexagon Honeycombs

Do you remember climbing in the honeycombs along the Playtrail? Do you remember how many sides each honeycomb had? A honeycomb is shaped as a hexagon, a six-sided shape that creates the maximum amount of space with the least amount of material. If honeycombs were circles, there would be gaps between each. If honeycombs were squares or triangles, the space created would be smaller.

Material: Tape, yellow construction paper, scissors

Procedures: Use the template to cut out six identical pieces of construction paper. For each piece, make a crease at each fold line to build a hexagon and secure the shape with tape. Place three "standing" hexagons on a table surface and tape them together. Place two "standing" hexagons on top of them and tape them to each other and the bottom row. Place one "standing" hexagon on the top and tape it to the second row of hexagons. Make a copy of the bee drawing, cut it out, and tape it where you would like on your hexagons. You have now built a model of honeycombs! (If you had real honeycombs, they would be made of wax secreted by the worker bees.)



Bee spit and honey

Worker bees may work hard outdoors, but they are also handy in the kitchen. Back in the hive, a worker bee throws up the nectar she has gathered. Other workers place a drop of the nectar in their mouth. The enzymes they secrete in their saliva start to turn the nectar into honey. The final honey product is created only when the hive temperature is warm enough to cause the nectar's water to evaporate. What honey is not fed to bees in the hive is stored in the honeycombs for winter.

Enjoy a snack of honey and thank the bees that made it!

What does it mean when a honey jar is labeled clover honey or buckwheat honey? Light and mild clover honey comes from the nectar of clover. Dark and bold buckwheat honey comes from the nectar of buckwheat.

Pollination power

Most flowers are composed of male parts, female parts, and other structures. The male part of a flower is called the stamen. Composed of a filament and an anther, it is the pollen-producing part of a flower. The female part of a flower is called a pistil. It is composed of a sticky stigma that receives pollen grains, a style (the stalk that supports the stigma), and an ovary at its base. Pollen travels from the stigma down the style to the ovary where tiny ovules, once fertilized, become seeds. When we eat an apple, we are eating the flesh that surrounds an ovary that we call the core.

Other parts of a flower include the petal, the colorful part that attracts pollinators, and the sepal, a modified leaf that protects a bud.

Flower anatomy

Venture out into a garden or park in search of a flower to dissect. Large flowers such as lilies, irises, tulips, and daffodils work well because their parts are large. You do not need equipment to dissect a flower, although tweezers and a pocketknife are helpful. Let your child pull apart the petals and find the stamens. Can your child see any pollen on the anthers? Have your child look for the pistil. It is located in the center of the flower and is usually thicker than the stamens. Follow the pistil to the ovary. Have an adult break the ovary apart (or cut it lengthwise with a pocketknife). Can you see the ovules inside?

Now that you have dissected one flower, dissect a different flower. Are the basic parts the same, flower to flower? What is different about them?

When an insect lands on a flower, it will probably bump into the pollen-bearing anthers. Pollen easily transfers onto fuzzy insect legs and other body parts. Then, when the insect lands on another flower, there is a good chance that flower will be pollinated and its seeds fertilized.

Safety tip: Bees can sting, so make sure you do not get too close to them.

Gathering nectar and pollen

Flowers produce nectar to attract a pollinator like an insect, bat, or bird. Flowers produce pollen to fertilize seeds. Some pollen is transferred by wind or water. Other pollen is transferred by pollinators. Attracted to the nectar, a pollinator picks up pollen from the male part of a flower and inadvertently transfers it to the female part of another flower. The pollinator gets a meal and the plant gets a free service.

Go on a garden walk and look at several flowers. Gently brush your finger against the stamen of a flower and see if any pollen rubs off. What color is it? Next, study the shape of each flower. Use the information below to figure out which flowers in your garden are likely to attract these pollinators:

Long, tubular flowers (hummingbirds, orioles)
Flowers with “landing platforms” (bumblebees)
Flowers with flat tops (butterflies)
Flowers that bloom at night (moths, bats)

Homes for Bees

Some honey bees live in hives people build, called supers, that are placed on farms and orchards. This is done to maximize the chance that crops are pollinated in order to produce fruit, nuts, and other foods. Bee supers also provide beekeepers with easy access to honeycombs and their honey. Other social bees live in hives built in hollow logs, tree branches, and other natural places.

Most bees, however, are not social. Instead, they are solitary. They often nest in an existing hole in the ground or a plant branch. There, a female will lay an egg in a cell and supply it with food for the larva.

Building a Bee Home

Materials: small clay pot (4-6 inches in diameter), clay, bamboo cane, and masking tape

Procedures: You can build a home for solitary bees. With help from an adult, cut at least 20 pieces of hollow bamboo cane the same height as the clay pot. Place clay at the bottom of the pot. Bundle the canes together with tape and press them into the clay. Find a place in your garden where you can lay the pot on its side. Visit it regularly to see if bees have discovered your hotel.

Citizen Science

Biologists conduct large research studies to catalog how many different kinds of animals exist regionally or even nationally. Sometimes they just focus on one particular species. Often they ask for help because the scope of their research is so large. "Citizen science" invites individuals to record their observations about a certain kind of animal on a website. By doing this, ordinary people contribute important information to a central database that is analyzed by trained biologists.

There are several bee-based "citizen science" projects your family can become involved in. The best way to find out about active ones in your area is to look them up on the Internet or check them out at www.thedailygreen.com.

Information about the following citizen science bee monitoring projects can be found online: The Great Sunflower Project, Bee Hunt, Bee Spotter, and the Bumble Bee Nest Survey.

Conservation message: Bees are important members of an ecosystem because they help pollinate flowering plants. Sadly, many bee species are on the decline due to many factors.

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