



Creating Sustainable School and Home Gardens: **Native Bee Homes**

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When most people think of a home for a bee, they probably picture the white wooden hives or dome-shaped skeps associated with beekeeping. Those homes are just for honeybees, a single social species of non-native bee that is kept around the world for honey production and large-scale agricultural pollination. Honeybees are very important insects for agriculture in the U.S., but did you know there are over 4,000 native U.S. bee species that are also important to agriculture and that maintain our native ecosystems and flower biodiversity?

Honeybees are non-native to the U.S. and are used for honey production and crop pollination. Over 4,000 native bee species in the U.S. also contribute to agriculture and biodiversity.

This resource sheet provides an overview of native bee homes (bee hotels, bee houses, cavity nests), which are used in pollinator conservation to promote solitary bees, such as leafcutter (Figure 1), mason (Figure 2), resin, and carpenter bees.

Native Bee Homes

- A native bee home is simply a box, house, or tube that can hold many smaller tubes and provide nesting spaces for native cavity-nesting bees and other insects (Figures 1 and 2).
- They are simple tools to promote solitary bee populations and are easily placed in your own backyard.
- The bees that use the houses have a simple life cycle: a single female bee will emerge in the spring, provision a nest with a pollen ball, and lay an egg on it. The larva will hatch from the

egg, eat the pollen ball throughout the season, develop into a pupa, overwinter until the next spring, and emerge to start the cycle again.

- Because they are solitary and don't store resources, the bees and other insects that use the homes are **not** aggressive or a threat to pets or kids.



Figure 1. Leafcutter Bee

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Figure 2. Mason Bee

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Obtaining a Bee Home

- Many companies produce pre-made bee homes, paper and reed tubes, and tools for maintenance. They may offer educational resources and videos to help beginner and advanced bee home users. Some suggestions are provided in the Resources section.
- Bee homes also can be easily made. Any sturdy container that can fit 6-inch-long paper or reed tubes could work—even a milk carton (Figure 3)! Nesting tubes can be rolled from paper or purchased from a supplier separately.



Figure 3. Bee Home Made From a Milk Carton

When, Where, and How to Install Bee Homes

When to Install

1. Install the home before the last frost in late winter or early spring to be sure your home is available for the early spring mason bees. Leafcutter bees will use the home in the summer.

Where to Install

2. Find or install a sturdy structure (post, wall, tree branch, fence) within 300 feet of floral resources (Figure 4).
3. Choose a dry calm location. Protect it from harsh wind and rain by providing a roof or tilting it slightly down. Avoid high traffic locations where humans will disturb them.
4. Face the opening of your bee home south or southeast so that they can wake up with the warmth of the morning sun. Ensure



Figure 4. Bee Home Installed on a Sturdy Post

no shade covers the home in the morning. In very hot environments, place the home in an area covered by afternoon shade.

How to Install

5. Mount the bee home about 5 feet from the ground using a nail or screw for chalet-style homes or zip ties for tube-style homes (Figure 5).
6. Tips: Some chalet-type bee homes have a keyhole in the back that the nail will securely fit into. Make them snug but not too tight for later removal. For tube-shaped homes, mount them horizontally beneath a branch or fence, or nestle between branches with sturdy outdoor zip ties.
7. Avoid moving the bee home throughout the active season or bees will not be able to find their way home.
8. We recommend placing a wire mesh guard over the front of the house to keep the tubes in and reduce bird colonization and predation (Figure 5).
9. Remember to fill your home with tubes of *various* sizes. We recommend 2mm-6mm tube sizes in paper and reed materials (Figure 6).



Figure 5. *Bee Home Affixed With a Zip Tie*

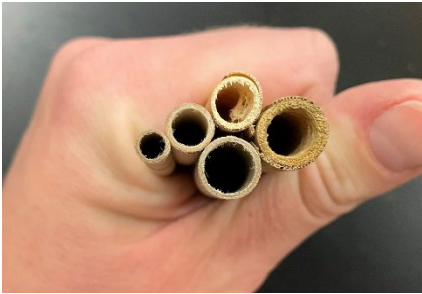


Figure 6. *Various Reed Tube Sizes for Bee Homes*

Fall Cocoon Care

- By late fall when the bees are no longer flying and the first cold temperatures set in, the cocoons will be ready for hibernation.
- It is recommended that tubes be removed from the house and stored to keep the developing bees safe from parasites, birds, or other predators.
 - Tip: When the tube has been filled with cocoons, you'll see the end has been capped with mud, resin, or leaves. It can be hard to tell if they only filled it partially. You can use a skinny long stick to poke inside to be sure, or just store them all to be safe.
- Remove the nesting tubes, bundle them together with a rubber band, and store them in a mesh bag or other breathable container.
- Store the tubes in an unheated area protected from rain, snow, and direct sunlight. A garage or shed works great! You can also store them in a refrigerator between 34 °F and 38 °F, with optimal humidity 30% to 80%. Remove tubes from the refrigerator as temperatures warm outside.

- Advanced users: If using reusable nesting materials or raising mason bees, open nests up and remove cocoons to store them for winter. For more information, see the [Crown Bees'](#) website in the resource list below.
- When spring temperatures warm to about 50 degrees outside, occasionally check for emerging adults, and then set the nesting materials back out in the reinstalled home with fresh nesting materials.

Maintaining the Bee Home

- Uninstall and store your bee home out of the elements in the fall and winter to extend the life and durability of the home.
- Check the home often for mold and parasites that might be dangerous to bee health.
- Clean your bee home before storing it in a dry place for winter by using a water and bleach solution (3:1 by volume). If worried about using bleach, other products are available from suppliers that use less harmful ingredients but will still kill mold and fungi like chalkbrood.

Other Considerations

- If you want to decorate the bee home, especially if painting, allow plenty of time for it to cure; otherwise, the smell may prevent bees from nesting.
- You may find more than bees enjoying your house! These homes are also frequently used by important solitary predatory wasps (potter wasps) that keep your garden clear of caterpillars. They are also not aggressive since they don't have colonies they are protecting.
- Ants can be a serious problem in bee houses, preventing bee colonization, and should be immediately removed if detected in the homes.

Fun Facts About Bees

- There are more than 20,000 bee species in the world! Only 10% are social, like honeybees; the other 90% are solitary bees!
- Solitary bees live alone. Each female builds her own nest, collects pollen, and lays her eggs.
- One-third of solitary bees nest in cavities: stems, branches, holes, or cracks.
- Cavity-nesting bees choose nests based on sight and smell and can be attracted by pheromones to artificially made nests.
- After choosing a nest, a bee will memorize the exact location. This means you don't want to move a bee nest; otherwise, it could lose its way home.
- Solitary bees do not store honey or wax and do not defend their homes. Solitary bees are gentle and rarely sting, making them safe around children and pets.
- Solitary bee species are often better pollinators. Honeybees have special pollen baskets on their legs to transport pollen which stops it from falling out and pollinating flowers. Native bee species carry loose pollen on their bodies, which is more likely to fall off when they land, increasing pollination.
- Mason bees are one of the earliest species to emerge in the spring, making them essential for spring crops. Different native bee species are seen at different times of the year.

- Leafcutter bees use their strong jaws to cut perfect circles from the edges of leaves, which they carry back to the nesting tubes to line them for their babies.
- Bees are diverse! In North America, the smallest bee species, *Perdita minima*, is less than 2 millimeters long and the largest, the female carpenter bee, can get as big as a quarter. It is important to have cavities of different sizes to accommodate different-sized bees.
- It is estimated that wild bee populations provide half of crop pollination services worldwide, so bees are very important to us all!

What You Can Do at Home to Help Native Bees

- Avoid using manufactured pesticides or herbicides unnecessarily. They harm good insects, too, and kill plants they need for survival.
- Plant flowers or other pollen-producing plants that will provide pollen and food for bees and attract them to the area year round. Leave the weeds! They're food for bees!
- Plant native plants since they provide food for native species and are more adapted to survive in your area.
- Be an advocate for the environment, against deforestation and habitat loss. Habitat loss and urbanization are among the leading causes of biodiversity loss.
- Become more carbon neutral and help fight greenhouse gases contributing to climate change.
- Buy organic-certified products grown without heavy pesticide use.
- Teach others what you know! By spreading information on pollinator conservation, we can come together and help make a positive impact.

Resources

Websites and Videos

- [Utah State University Extension Beekeeping](https://extension.usu.edu/beekeeping/) (extension.usu.edu/beekeeping/).
- [Crown bees](https://crownbees.com) (crownbees.com).
- [Xerces Society - Nesting resources links](https://xerces.org/pollinator-conservation/nesting-resources#resources) (xerces.org/pollinator-conservation/nesting-resources#resources).
- [Xerces Society - Nests for native bees](https://xerces.org/publications/fact-sheets/nests-for-native-bees) (xerces.org/publications/fact-sheets/nests-for-native-bees).
- [Getting Started With Mason Bees, Part I: Providing Resources](#) (Cincinnati Nature Center, 2021, March 31).
- [Getting Started With Mason Bees, Part II: Harvesting Tubes](#) (Cincinnati Nature Center, 2021, October 27).
- [Watch This Bee Build Her Bee-Jeweled Nest](#) (PBS Digital Studios, 2018).
- [This Bee Gets Punched by Flowers for Your Ice Cream](#) (PBS Digital Studios, 2019).

Children's Book

- [Am I Even a Bee?](#) (Muth, 2022).

Articles

- [The Ecology of Solitary Bees](#) (Linsley, 1958).
- [Gardening for Native Bees in Utah](#) (Cane, 2013).
- [Benchmarking Nesting Aids for Cavity-Nesting Bees and Wasps](#) (von Königslöw et al., 2019).

Acknowledgments

[Smart Foodscapes](https://usu.edu/smart-foodscapes) (usu.edu/smart-foodscapes)
Scan the QR code to learn more.



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