



BeeAware!

Participant Binder



By Nora Spratt

Girl Scout Gold Award Project 2021

In Collaboration with:

Blue Hill Heritage Trust &

Blue Hill Peninsula Explorers 4-H Club ¹



Hi! I'm Buzz the bee!

I'm a solitary bee, which means I don't make honey or live in a colony. I live alone and like to keep to myself. I don't even want to sting you because I would rather find food, lay eggs, and pollinate plants at the same time.

But I'm not the only pollinator out there—my friends are important pollinators too! Bees, butterflies, moths, beetles, ants, flies, and wasps are all pollinators. Even birds and bats can pollinate too!

Join me to learn about bees and pollination!



Roll a Pipe Cleaner Bee



The main differences between bees and wasps are that bees have more hairs on their bodies, and bees have barbed stingers (with small hooks) but wasps have smooth stingers. Wasps also feed insects to their larvae, but bees only eat pollen and nectar. There are lots of solitary wasps that aren't aggressive, and are great pollinators too.



You Will Need:

- Black, yellow and white pipe cleaners
- Glue

How To Make It:

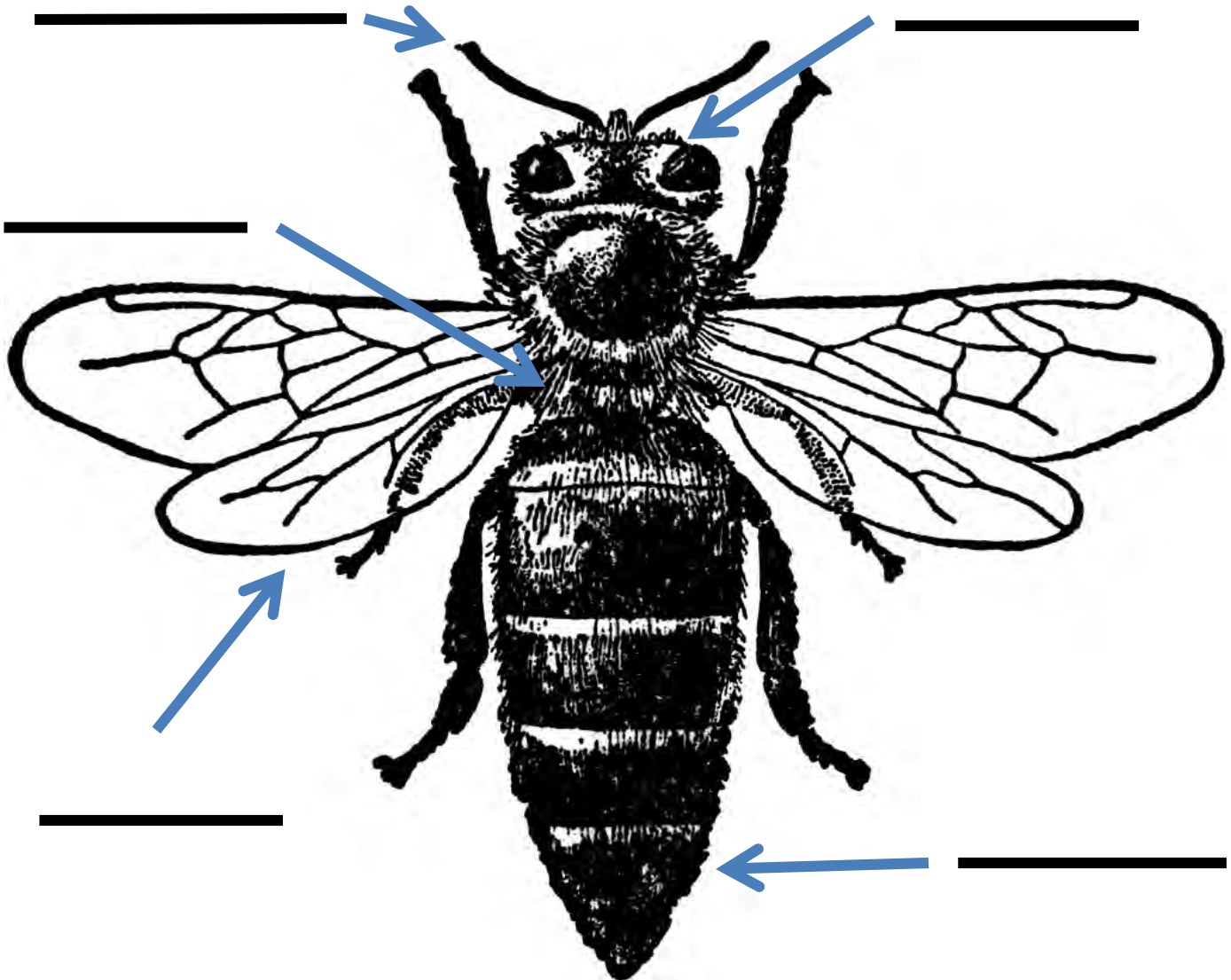
1. Twist a black and yellow pipe cleaner together.
2. Twist them around your finger. Tuck in ends.
3. Cut a white pipe cleaner into 4 equal pieces.
4. Twist the ends of one piece to make a tear drop shape for wings.
5. Insert wings into black and yellow pipe cleaners. Secure with glue.

[illegible]

Did you know... • There are nearly 4,000 bee species in the United States • A majority are found in the southwestern desert and along the California coast • Most species are solitary; they do not live in a hive • Roughly 70% of bee species live in the United States but many are native to elsewhere

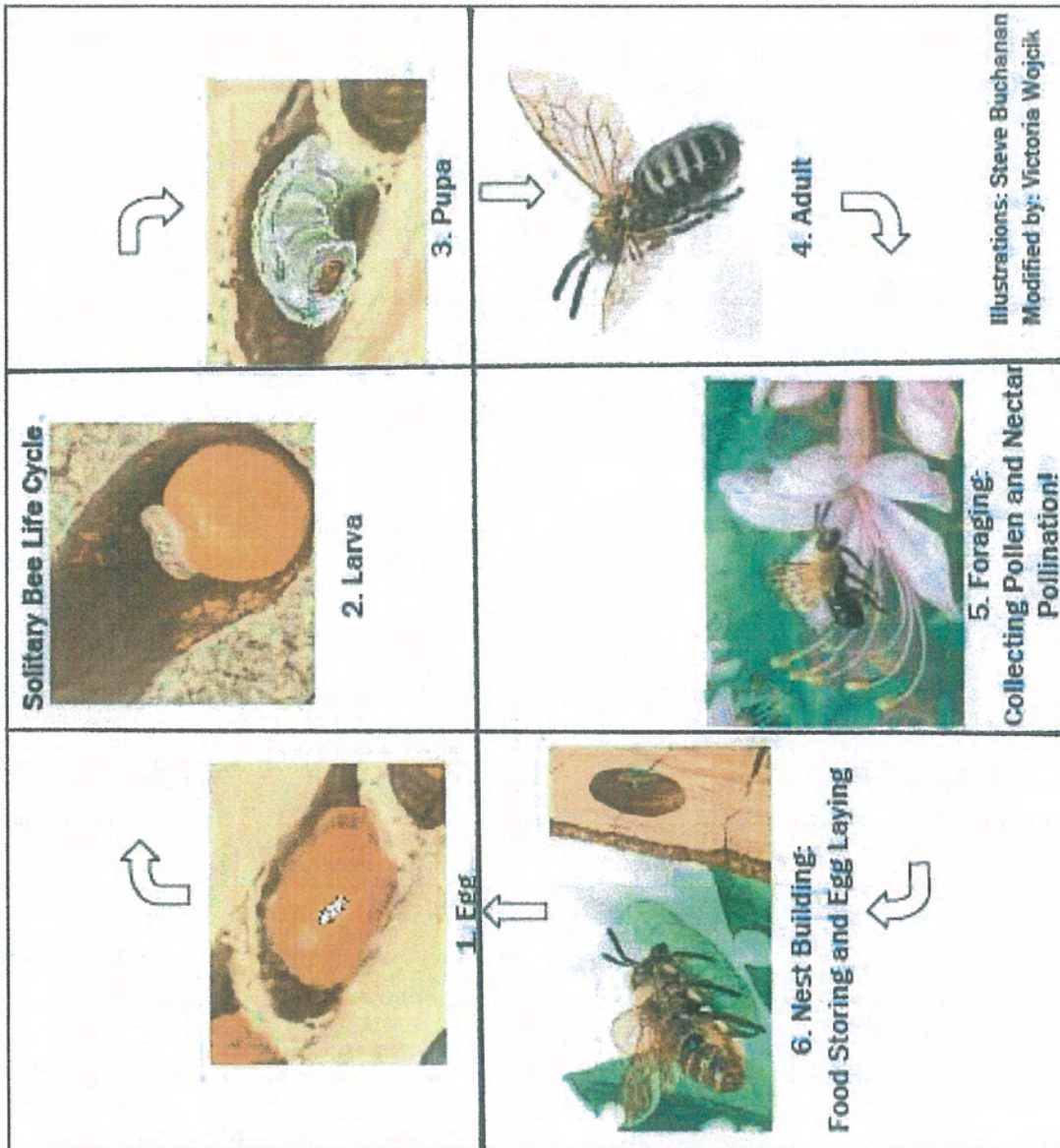
Label the Parts of a Bee

Abdomen	Antennae	Head	Thorax	Wings
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Bees are insects. Insects have ____ body parts. The body parts include the _____ (top), _____ (middle), and _____ (bottom) of the insect. Bees use their four _____ to fly to flowers. Bees find flowers using their _____.





Dissect a Flower



Can you find all the parts of the flower? Try experimenting with different types of flowers from your garden or the florist. Lilies, alstroemerias and snapdragons work well. Try roses, daisies or mums too!

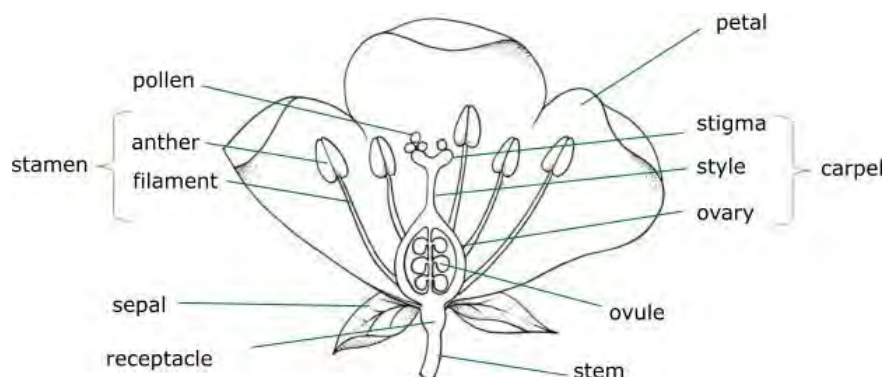


You Will Need:

- Large flowers from the garden or florist, such as lilies, snapdragons, daisies or tulips.
- Scissors or knife
- Tweezers

How To Make It:

1. Use tweezers and scissors or a knife (with adult help) to carefully pull apart the pieces of the flower.
2. See if you can identify the different parts of the flower, based on the diagram below.



Flower Dissection Sheet

<div data-bbox="764 1472 802 1782" data-label="Text"> <p>Draw Your Flower</p> </div>	<div data-bbox="245 1236 282 1331" data-label="Text"> <p>Pistil</p> </div> <div data-bbox="440 1031 477 1152" data-label="Text"> <p>Stigma</p> </div> <div data-bbox="948 1052 985 1142" data-label="Text"> <p>Style</p> </div> <div data-bbox="1382 1041 1419 1152" data-label="Text"> <p>Ovary</p> </div>	<div data-bbox="813 386 850 638" data-label="Text"> <p>Petals= Corolla</p> </div>	<div data-bbox="1382 396 1419 632" data-label="Text"> <p>Sepals= Calyx</p> </div>

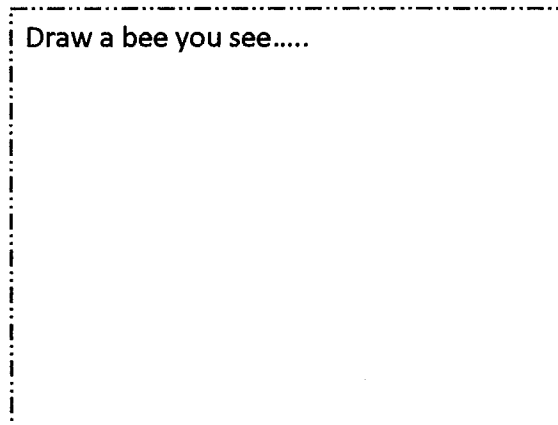


Flower and Bee Observation Sheet

Look for bees visiting flowers and watch them carefully. When bees are busy visiting flowers, they will ignore you as long as you don't get too close.

Can you see different types of bees? How are they different? Look at their color, shape and size. Describe the bees.

Draw a bee you see.....



How many different types of bees did you see? _____

Can you see pollen on the bees? YES NO

Where is the pollen on the bees? _____

Which flower do the bees like to visit most? Draw a picture.

How is this flower attracting bees? (circle)

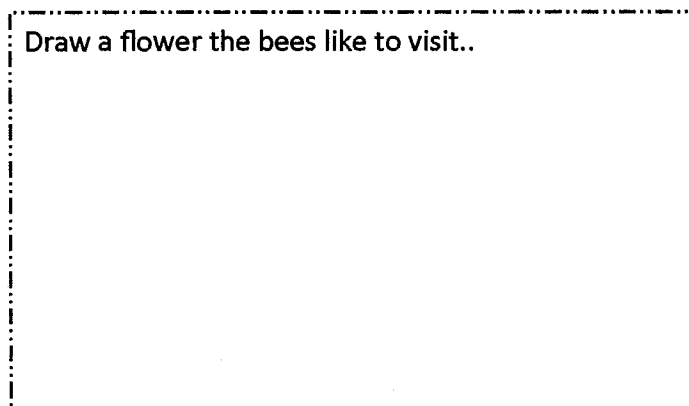
Bright color Yes No

Smell Yes No

Lots of pollen Yes No

What shape is the flower? _____

Draw a flower the bees like to visit..



How many different types of flowers do the bees visit? _____.

How long does a bee stay on each flower? Count slowly. _____.

Do bees visit lots of flowers on the same plant? _____.

Do you think the bees are doing a good job at pollinating? _____.



Cut this out, write the install and remove dates (remove one year after installation), and then use packaging tape to adhere to the bottom of the milk carton bee house.



BeeAware! Milk Carton Bee Houses



To make:

Materials:

- Cleaned Milk/Juice Cartons
- Twine
- Duct Tape (optional)
- Nesting Tubes (Paper/Plastic Straws)
- Scissors
- Packaging Tape
- Printed and cut out Bee Aware Caution Sign (see image below)



Instructions:

1. Take a cleaned cardboard and wax milk/juice carton and cut off the top.
2. Poke a hole in one of the bottom corners and run your piece of twine through it and (so that it comes out the front and goes through the back). Tie the string together to allow it to be hung. (More holes can be made in the different corners to better secure the house).
3. Take your paper and wax straws and fold-over one of the ends, basically sealing the end. This will also make the straw is shorter than the carton edge when placed inside (so that the tubes do not get wet!). You want the straws to be 6-7" long.
4. Stuff your milk carton full of straws so that they are secure and do not slide out when tipped over.
5. Print, fill out, cut, and tape the informational Bee Aware Caution Sign to the bottom of the carton with packaging tape. The expiration date is one year after you install it (once all of the bees have emerged!). Use this expiration date if you cannot maintain the house-[this is to ensure that we are in control of the bee diseases/parasites/fungi/bacteria without having to thoroughly clean everything!].



BeeAware! Milk Carton Bee Houses



6. -Optional- Wrap the outside of the milk carton with duct tape. (Note- this helps to further weatherproof and decorate the house, however it makes the house no longer biodegradable!).

Instillation:

Ultimately, secure the house (so that it isn't moving around in wind) about 3-5 feet above the ground facing the morning sun. This is so that the bees can receive the most sun to warm them up. Make sure that the house is slightly angled down so that rain will trickle off and not into the nesting tubes.

To Maintain:

Ideal Maintenance:

Once the bees have finished nesting- meaning that the tubes are sealed and there is no activity in the late fall/September- it is best to shelter the house from the snow by storing it for the winter inside a cardboard box in an unheated shed or garage. The baby bees inside the house hibernate throughout the winter and need the cold temps- but they cannot get wet! In the early spring, clean the milk carton with a mild bleach-water solution (or simply make a new one), replace the old straws with fresh straws, and install outside. Place the sealed and occupied straws next to your bee house to allow the bees to emerge naturally. Discard the used tubes once emptied.

Minimal Maintenance:

At the very least, after the bees have initially emerged **you absolutely need to remove the used tubes and replace them with new tubes. If you are unable to maintain, if broken, or if the house is disease ridden, PLEASE discard the house and tubes altogether (and you can replace it with a new one!!)**

The Importance of Maintenance:

If these bee houses are left out for too long without being cleaned, bacteria, diseases, parasites, and fungi can all find their way into your houses and end up growing out of control and spreading to all of the bees living inside! In this way, the houses could eventually become a death trap instead of a safe haven... eek! Think of it like this- when you go to a hotel, you want the room to be clean, right? Imagine if the hotel rooms were never cleaned between guests and how gross that would be! The same thing goes for your own little bee hotel- make sure to be a good hostess!



BeeAware! Milk Carton Bee Houses



---> I would much rather you not put up your bee house rather than leave it up for a long time and have it not be maintained! I know that we can all be busy bees ourselves, but it is your responsibility to make sure that you are beeing kind to these bees by maintaining the houses!)

Native Bee Season:

The new bees emerge from their nests in early spring (around May), then they are all out and about making their nests and pollinating through the summer until the late fall (around September), and then they hibernate all winter until it's spring again!



BeeAware! Bee House Maintenance



Bee nests require routine maintenance and regular replacement to prevent the build up of parasites and diseases that may affect the developing brood. In the early spring (around May), after the previous season's bees have emerged from their sealed nesting tubes, replace the used and/or diseased nesting tubes with fresh nesting tubes (instructions below).

Straw replacement is absolutely necessary each spring and is critical to the success of the bee houses! This cannot be stressed enough. If these bee houses are left for too long without being cleaned, bacteria, diseases, parasites, and fungi can all find their way into your houses and end up growing out of control and spreading to all of the bees living inside! In this way, the houses could eventually become a terrible death trap instead of a safe haven- working against all efforts to provide a safe habitat in the first place!

To Fill Bee House with Nesting Tubes:

1. Cut the paper straws to about 5.25-5.50" in length.
2. Pinch and collapse $\frac{1}{2}$ " (about a thumbnail's length) at the end of the straw. Then tightly roll the flattened $\frac{1}{2}$ " until the straw measures to roughly under 5". This will seal the end of the straw to help prevent the spread of parasites.
3. The straws should be just under 5" and should not protrude past the bee house side walls. Pack the straws into the wooden nesting house with the open holes facing outward. About 70 straws should fit snugly in the house. Pack tightly enough so that no tubes slide out when the house is tipped.



To Replace Old and Used Nesting Tubes:

1. Pull the used (now empty) and/or diseased nesting tubes from the house and replace them with fresh tubes. Discard the removed straws.





BeeAware! Bee House Maintenance



To Order More Paper Straws:

8mm diameter paper nesting straws (Mason Bees)

- <https://www.webstaurantstore.com/ecochoice-7-3-4-kraft-giant-unwrapped-compostable-paper-straw-case/485UPG7KFT.html>

6mm diameter paper nesting straws (Leafcutter Bees)

- <https://www.webstaurantstore.com/ecochoice-7-3-4-white-jumbo-unwrapped-paper-straw-pack/999UPJ7WH.html>

For More Information:

- Bee Aware! A Native Bee Stewardship Program - <https://bluehillheritagetrust.org/bee-aware-a-native-bee-stewardship-program/>
- Guide to building and managing a mason bee hotel - <https://colinpurrington.com/2019/05/guide-to-diy-mason-bee-houses/>
- How to Make and Manage a Bee Hotel: Instructions that Really Work - <https://www.foxleas.com/make-a-bee-hotel.asp>

If you have any questions, please email beeawaremaine@gmail.com

Make a Bee Bath

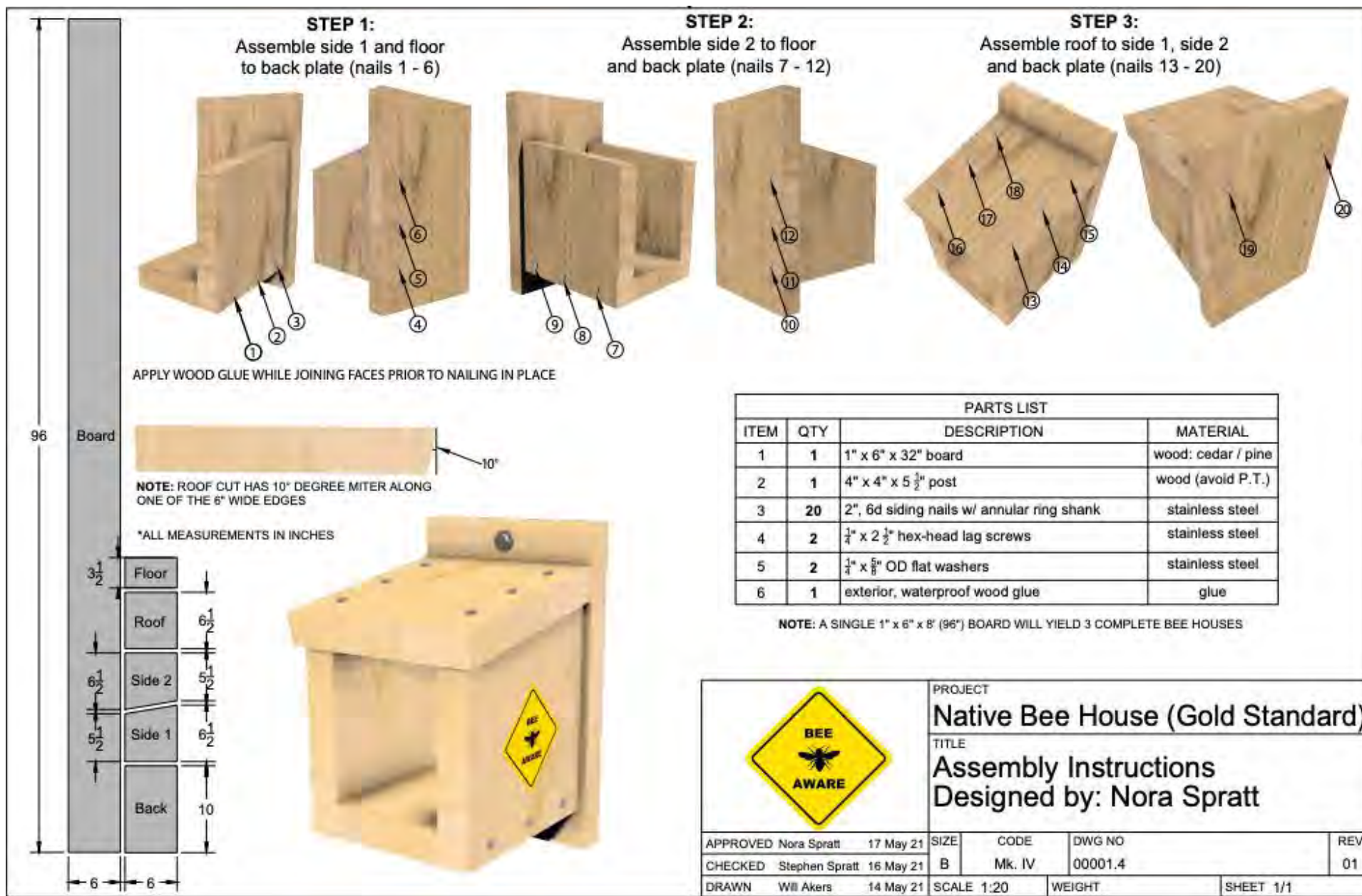


You Will Need:

- Bird bath or small dish
- Rocks

Just like birds need water, so do bees and other pollinators. You can help us out by putting out a small dish of water next to your bee hotel or garden, or put some rocks in a bird bath so that we have something to land on before we take a sip!







Mounting the BeeAware! Bee House

1. Your BeeAware! bee house should be placed against a flat surface and located in an area protected from high winds. Find a secure place like the side of shed, fence post, or tree. However, *do not hang it from a string or wire*.
2. The front of the house should have a south or southwest exposure where it will get the most sun in winter to keep bees warm (bees are cold blooded and use the heat from the morning sun to get flying in the morning).
3. Make sure the bee house is at least 3-4, preferably 5 feet from the ground to deter ants and other predators.
4. It is best to have the front of the house angled slightly downward so that any water that may get in the house will run out. Nesting tubes should be ~1/2" inside the houses' edge.
5. Situate the house close to pollen-producing plants (they won't travel farther than 300 feet), as well as a good supply of claylike mud to cover up their nesting holes.



After bees mate, the female places eggs in the nesting tubes. Each egg is separated by nectar and pollen. It is at this time that the bees' pollen gathering also pollinates plants.

After the pollen and nectar is placed, the female places a mud plug in the tube (hence the term "mason"), then repeats the process with more eggs, pollen, nectar and plugs. When the tube is full, she finishes with a heavy mud plug and her work is done.

In the spring, the mature bees emerge from the tubes. Males exit first. Females emerge after males because the eggs are placed deeper in the tubes. This is a protective measure, assuring a good female population to help keep the species going.

6. Optionally, if you are concerned about squirrels or birds in the area, you may want to protect the house with chicken wire. Choose bird wire or hardware cloth with 3/4" openings and loosely create a 3" bubble around the front of the house. *Do not install the wire flush against the nesting materials because this keeps bees from being able to get in.*



References:

- <https://masonbeesforsale.com/pages/bee-information>
- <https://crownbees.com/>

Waggle Dance

What Is this Activity?



How do busy bees “tell” each other where to find pollen? In this game, you and your child play bees who find “pollen” by doing a dance.

Big Science Idea: Bees and flowers depend on each other to survive and thrive.



GO OUTSIDE

What You’ll Need:

Ribbon or similar colorful marker, scissors to cut the ribbon, “Doin’ the Waggle Dance” handout, video or phone camera (optional)

1. **Take your child to an enclosed outdoor** area that has trees, bushes, and other places to hide objects—your backyard or a park, for example.
2. (Optional, if flowers not in season.) On the way there, **check out any flowers** (without trespassing, of course). What colors are the petals? Which blooms are scented? Is there pollen (a white, yellow, or brown powder)? Any bees?
3. **Explain** that pollen is food for bees. (It’s a high-protein meal, like a burger; the flower’s nectar is a sugary snack, like soda.) Bees find pollen by zeroing in on the color or scent of a flower. They collect what they can and then tell the bees back at the hive where to find it.
4. **Wonder aloud:** *Bees can’t talk; so how do they “tell” the other bees where the pollen is?*
5. **Demonstrate and practice the Waggle Dance** (see diagram on handout), a simple way to understand how bees communicate. Look around for a source of human food (or, if there isn’t a restaurant in sight, choose any object) and follow the steps on the diagram together to communicate its direction and distance.
6. **Play the Waggle Dance Game:** Standing in the center of the play area, close your eyes and count to 10 while your child secretly hides a “flower” (the colored ribbon). Your child then returns to you and does the Waggle Dance. How fast can you find the flower?
7. **Repeat the game**, switching roles if you like, until you’re champion Waggle Dancers!
8. **Discuss:** *Where can bees in our city find flowers? Why do flowers make food for bees? What’s in it for them?* Explain that some of the pollen sticks to the bee’s body and so gets carried to another flower. That flower uses pollen to make



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Topic

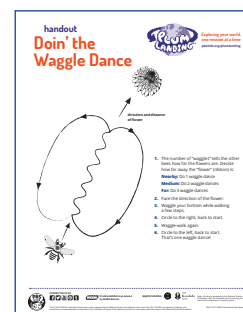
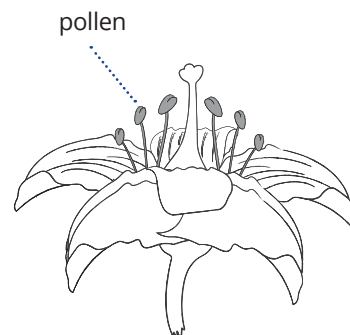
communication,
ecosystems

Activity Type

outdoors (all weather—
rain, clouds, sun, or snow)

Activity Time

15–30 minutes



seeds, which can grow new flowers. Bees would starve without pollen and nectar from flowers; flowers would die out without bees to help them make seeds.

EXPLORE SOME MORE

The Brick-Eating Ivy Mystery

Watch this short video that shows another example of how plants and animals depend on each other to grow and survive. Gabi and Oliver explore whether ivy can really destroy buildings and cause them to collapse.

Go See Bees

Caution: Do not do this activity if your child is allergic to bees.

Where? Visit a local urban beekeeper who gives tours, a zoo, a science museum with a beehive on display, or an outdoor public garden with plenty of blossoms. Outdoors, watch the bees calmly from a safe distance. Bees won't sting unless they feel threatened.

Outdoor Family Fun with Plum App

This app gets families outdoors exploring the world. Every day, the app offers five outdoor missions to get everyone thinking and talking about nature and the science that's all around us.



VISIT pbskids.org/plumlanding to find apps, videos, games and more activities.



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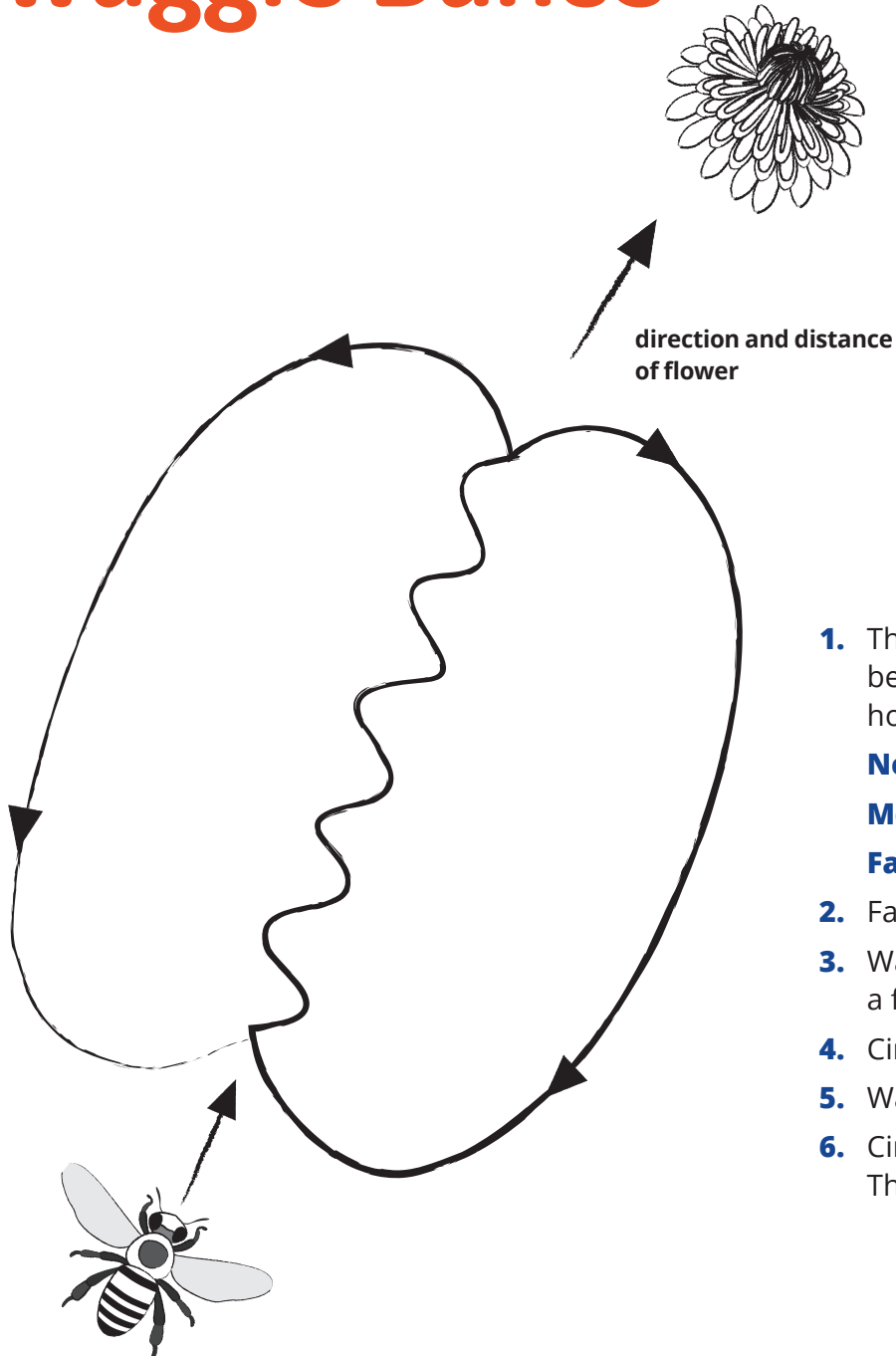
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handout

Doin' the Waggle Dance



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1. The number of “waggles” tells the other bees how far the flowers are. Decide how far away the “flower” (ribbon) is:
Nearby: Do 1 waggle dance
Medium: Do 2 waggle dances
Far: Do 3 waggle dances
2. Face the direction of the flower.
3. Waggle your bottom while walking a few steps.
4. Circle to the right, back to start.
5. Waggle-walk again.
6. Circle to the left, back to start.
That's one waggle dance!



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5 Ways to Increase Nesting Habitat for Native Bees

By Justin Wheeler on 17 March 2017

Birds do it. Bees do it.

Like birds, bees lay eggs in nests. Some even “feather” their nests with plant material or the fluff from downy leaves. 70% of bees nest in tunnels in bare earth, 30% lay their eggs in cavities – holes in dead wood, hollow stems, or even cracks in concrete or stone (only honey bees form hives.)

Both ground nesting and cavity nesting bees create a ball from pollen and nectar on which they deposit an egg in a “bee nursery” known as a brood chamber. Ground nesting bees form tunnels in the ground with multiple brood chambers. Cavity nesting bees find an existing tunnel in the form of a hole in dead wood or the hollow stems of certain plants. They create brood chambers starting at the back of the tunnel and working their way to the front, sealing each chamber as they go with mud or bits of plant material.

Bumblebee species nest in small colonies where worker bees attend to the nest. They usually build their nest in dry, protected and hidden cavities below ground, such as an abandoned rodent burrow, under piles of wood or brush, under sheds or sometimes in old birdhouses.

When we keep a clean and tidy garden, we’re frequently eliminating natural materials and features that would otherwise provide nesting habitat for bees and other insects. It may sound too good to be true – but here are some ways you can provide much needed habitat for bees and other insects while saving time, money, and energy.

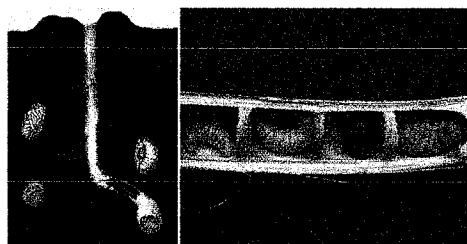
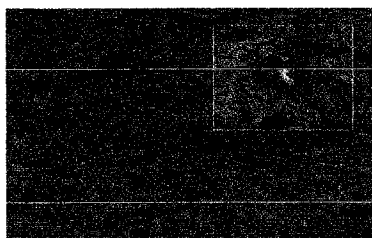


Illustration (left, Sarina Jepsen) showing ground nesting bees. Photo (right, Katharina Ullman) showing cavity nesting bees in a hollow stem.

Mulch less, mulch different

70% of native bees nest in the ground. Frequently when the words “ground nesting” are mentioned, the natural reaction is to think of wasps, who have a bad reputation as ground nesting insects. Unlike ground nesting wasps, who will form hives in abandoned rodent burrows and larger underground cavities, native ground nesting bees form small, non-aggressive colonies. Ground nesting bees, such as the mining bee shown at right, are some of the earliest pollinators to emerge in spring, making them vital to pollination of fruit trees such as cherries, plums, and apricots, as well as other flowering trees, shrubs, and spring ephemerals. When it comes to ground nesting bees, access to bare ground is essential, and even a 1-inch layer of mulch can be as impenetrable as pavement to these small bees.

People mulch for many reasons; to suppress weeds, prevent erosion, and because they feel it provides a clean aesthetic. If you must mulch, consider using compost or shredded leaves instead of chipped wood products. These alternatives will have the same weed suppression, water retention, and other properties – yet be light enough to allow ground nesting bees to pass through. Additionally they release nutrients and provide organic matter that actually improves your soil quality! Also consider mulching just the parts you see. It's often sufficient to mulch just the first two feet or so into a bed, leaving areas in the back uncovered to allow access for pollinators.

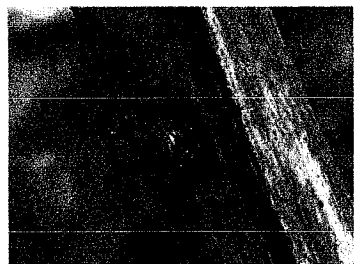


Bees of the *Andrena* genus are commonly known as mining bees. They excavate tunnels in bare soil, such as this baseball field at an elementary school. They are non-aggressive and important early pollinators of many crops including fruit trees such as plums, peaches, and cherries.

Grow raspberries...

...and other plants with pithy or hollow stems such as Joe Pye weed (*Eutrochium* spp.), elderberry (*Sambucus* spp.), hydrangea, and others. Cavity nesting bees will make nests in the dried stems and twigs from previous years' growth, so don't aggressively cut back or clean up these plants and consider leaving dead branches alone. Other invasive plants such as bamboo, Japanese knotweed, and teasel should not be planted, but bundles of stems from these plants can serve as valuable nesting material (more on that below).

Don't forget the grasses, too! While we often skip grasses for showy flowers, native bunch grasses, such as switchgrass (*Panicum* spp.), indian grass (*Sorghastrum nutans*), prairie dropseed (*Sporobolus heterolepis*), little bluestem (*Schizachyrium scoparium*), big bluestem (*Andropogon gerardii*), and grama grass (*Bouteloua* spp.) provide nesting sites and protection for bumble bee queens to overwinter. Many of these grasses do double duty, serving as butterfly host plants as well.

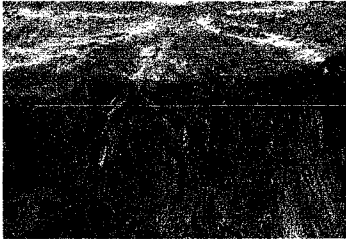


Plants with pithy stems can be excavated by small carpenter bees and other cavity-nesters.

Photo: Nancy Lee Adamson.

Save a (dead) tree or “plant” a log

Maybe it's a reminder of our own mortality, but when we see a dead tree or even a dead branch, our first impulse is often “that's gotta go!” In many cases this material poses no real danger, and, if it can be tolerated, this dead woody material provides an abundance of habitat for all sorts of wildlife. Beetles and carpenter ants burrow into dead wood, birds go after these insect treats, and this activity creates perfect chambers for cavity nesting bees to lay their eggs. While you may not want to gaze lovingly upon a dead tree from your kitchen window over morning coffee, you can add this valuable habitat to your landscape by leaving piles of twigs, branches, or logs in your garden.



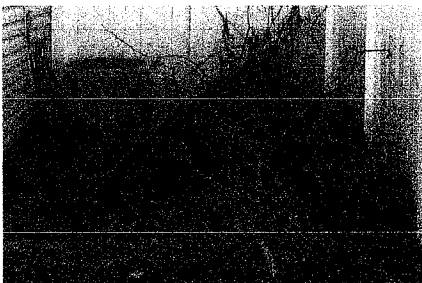
The holes in this tree stump were likely made by beetles who are breaking down the wood.

Cavity nesting bees will also use these holes. Photo: Don Keirstead.

Build a better brush pile

The very mention of a brush pile conjures up such nightmarish images (fire! snakes!) that the idea of adding one to your carefully cultivated landscape may seem anathema. Yet adding a brush pile is one of the most effective ways you can provide habitat for a diversity of wildlife while also benefiting the environment and saving money in the long-term.

In most municipalities, local waste management authorities will collect curbside brush and either chip it and compost it or haul it off to a landfill. In both cases, you're paying for this service in your trash bill. If everyone retained just a small amount of their clippings and pruned branches we could reduce the burden on our waste management system. More to the point however, small mammals will also make use of a brush pile, creating burrows that later provide space for bumble bees to nest. Brush piles also provide cover for other ground nesting bees, and provide food for many other invertebrates who eventually break the piles down into valuable organic matter for your garden



A small brush pile in an out of view spot in your garden provides shelter and nesting opportunities for all manner of invertebrates, birds, amphibians, and other wildlife. Photo: thespruce.com

Worried about it being an eyesore? Get creative and build a "brush fence", hide the pile behind ornamental grasses, or simply install a Pollinator Friendly Habitat sign to advertise your good intentions to your neighbors.

In recent years the concept of "bee houses" have gained popularity, with many D.I.Y. versions popping up on Pinterest and commercially available versions appearing in gardening catalogs. These artificial nesting structures are meant to support mason bees, leafcutter bees, and other cavity nesters.

Bee houses

Some use cuts of bamboo, others cardboard tubes. Many are elaborate and quite beautiful – but the efficacy of these structures varies widely. Building a bee hotel can be a fun, crafty, D.I.Y. adventure, and provide valuable nesting habitat, but when not properly maintained these structures become a sponge for pathogens and mites which build up in the nesting material over time. If choosing to design and build or purchase a man-made bee hotel, just be aware it's not a "set it and forget it" proposition.



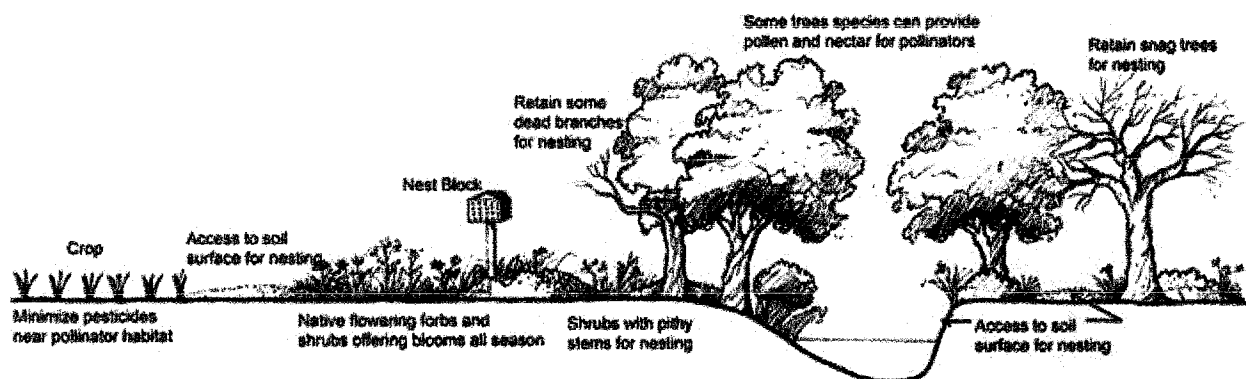
A small collection of bamboo stalks is an easy and inexpensive way to provide nesting habitat. Make a new nest over the winter each

year and hang it next to the old one. Once the bees have emerged in spring, remove and discard the old material. Photo: Mace Vaughan.

One of the easiest ways to create a “bee hotel” with minimal effort and maintenance is simply to bundle cuts of bamboo or other hollow or pithy stems that are closed at one end (bees will not lay eggs in cavities open at both sides) and hang them in a sheltered location. If possible, orient the material so it’s facing southeast so it will be warmed by the morning sun. Bamboo and common reed both provide excellent material for this purpose. Often you can cut just behind the node (raised bumpy part of the stem) to create a perfect tunnel. Hang your bundle beneath a roof overhang or other sheltered location or place them in a bucket laid on its side. (For complete details and instructions checkout our fact sheet [Tunnel Nests for Native Bees](#).) Whatever material you use, be sure to replace it every other year to destroy any pathogens or mites that may have also taken up residence in the material. A good plan is to make a new nest over the winter each year and hang it next to the old one. Once the bees have emerged in spring, remove and discard the old material.


Bringing it all together

This illustration shows how a well-designed garden can include many opportunities to provide nesting habitat as landscape features.



Source: USDA

10 Tips for Creating an Eco-Friendly Garden

 almanac.com/10-tips-creating-eco-friendly-garden

Supporting Native Plants, Pollinators, and Sustainable Practices in the Home Garden

By Catherine Boeckmann

April 21, 2021

It's not hard to make an eco-friendly garden, in other words, one that works with nature instead of against it. From choosing native plants to conserving water, here are 10 ideas to help you create an eco-friendly oasis.

Why Create an Eco-Friendly Garden?

The definition of "eco-friendly" is simply "not harmful to the environment." Of course, we don't intend to be harmful, however, how do we garden to protect nature, pollute less, conserve water, reduce our dependence on chemicals, and become more environmentally-friendly? When we work WITH nature, it's easier on us and on our planet.

You're probably well aware that the populations of our native bees, butterflies, and other insect pollinators have been declining for several decades. A study from January 2019 indicates 40% of insect species are threatened with extinction. Perhaps you've noticed fewer butterflies and bees in your own backyard?

Why does this matter? First, no insects means no food. About one out of every three bites of food you eat is due to those native bees and insect pollinators. About three-fourths of all flowering plants are pollinated by insects, as well as the crops that produce more than one-third of the world's food supply. Importantly, insects are the bedrock of our entire ecosystem (birds, lizards, frogs, and other wildlife). Without insects, birds and fish and small mammals decline; if they decline, the entire food web is affected.

Thankfully, in the past few years, many programs have shown that we actually CAN make a real difference by creating more eco-friendly gardens and using sustainable practices. Dr. Sverdrup-Thygeson, a professor of conservation biology at the Norwegian University of Life Sciences, states, "We can achieve a great deal with belts of trees and bushes alongside streams in residential areas, green shoulders and hedges along roads, and borders of wildflower meadows along the edges of fields."

Even a regular homeowner with a small garden can have a powerful impact, namely with: **native flowers and trees, pollinator host plants, nesting sites, and a refuge from pesticides.**

10 Tips for Creating an Eco-Friendly Garden

1. Choose Native Plants Over Non-Natives

“Native” plants are simply plants that occur naturally in the region where they evolved. Native insects evolved alongside them, as did native birds and wildlife. It’s one big ecosystem!

Exotic, non-native plants can sometimes wipe out native plant and insect species, which may harm the food web. Here’s how we can help prevent that:

- **Select native plants** for your landscape. See a list of common native North American plants.
- **Leave small areas for wildflowers.** These weedy plants are perfect for insects. See our video showing how to grow wildflowers to help pollinators!
- **Bright flowers** such as sunflowers, candytuft, and marigolds create places where ladybugs and lacewings can shelter and lay eggs.
- Consider a **mixture of plants with diversified sources** of nectar (e.g., shrubs, trees, and flowers—ideally, natives). Shrubs and trees such as dogwood, blueberry, cherry, plum, willow, and poplar provide pollen or nectar, or both, early in spring when food is scarce.
- **Look for a variety of plants that bloom in different seasons** (spring, summer, and fall) to attract insects across the year.
- **Adding native milkweed** to your garden provides food for monarch butterfly caterpillars, but don’t forget nectar sources for the adults, such as flowers that bloom in late summer.

Consider **planting a pollinator strip** as a border to a vegetable garden or a **wildflower border** along the edge of your field. You’ll improve pollination of your crops and also support bees when the crops stop blooming. It will also attract and support other pollinators, such as hoverflies and wasps, that control crop pests.

2. Welcome Beneficial Insects

Many people find insects annoying, but we should really start thinking about the fact that we can’t survive without them (although they certainly survived before our arrival).

Pollinators are critical to our food supply. They keep our flowers blooming; they increase fruit or seed quantity in three-fourths of our food crops.

- European honey bees, while still valuable, are not native to North America and are much less efficient at pollinating our native plants than native bee species. (Native bees may be up to three times more efficient than honey bees!) Read more about native bees, the best pollinators around.
- Native bees, the most important pollinators in most ecosystems, include **mason bees**, **sweat bees**, **carpenter bees**, **miner bees**, and **leafcutter bees**, which are all solitary bee species. Instead of living in colonies, like **honey bees** or **bumblebees**, solitary bees live on their own in burrows, reeds, or other protected areas. Install a native bee hotel. Learn more about bee houses. Or, drill holes of varying sizes in a dead tree that's still standing (if beetles haven't done it for you). Watch our video demonstrating how to build a bee hotel.

Bees aren't the only pollinators in the garden, though.

- Half of the **butterfly** species studied are in decline, with one-third threatened with extinction.
- **Flies** also play important roles! While you may expect butterflies to be the #2 pollinator, flies are actually the ones that hold that title!
- Other insects—such as **praying mantises**, **ladybugs**, **beetles**, and **green lacewings**—are fantastic at tackling pests. For example, lacewings and ladybugs eat aphids, which can decimate vegetable crops. Do not spray chemicals on your plants—and insects!

3. Go Easy on the Chemicals

All gardens have some pests, but deter them in ways that won't harm the food that you are growing or the beneficial insects!

Instead of spraying with chemicals, consider other options. From diatomaceous earth to neem oil to *Bacillus thuringiensis* (Bt), there are many less-toxic methods available that really work.

Incorporate plants that attract beneficial insects for pest control. See how to get rid of garden pests naturally.

Remember that chemical fertilizers and pesticides eventually end up in rivers, oceans, and wetlands. Pesticides and herbicides tend to kill many more creatures than the one or two bug species that we target, as annoying as they might be.

4. Mix in “Companion Plants”

Are you familiar with the practice of **companion planting**? Pair up the right plants to naturally repel pests. For example, dill and basil planted among tomatoes can protect from tomato hornworms. When paired together, companion plants improve each

other's health and yields.

Also, mix flowers and vegetables together! You don't have to choose between growing ornamentals and edibles. Many types of flowers confuse the "bad" pests and help you to grow a healthier garden.

5. Encourage Birds

Birds are pollinators, too!

- **Provide clean water** for birds (and insects) with a shallow dish, bowl, or birdbath with half-submerged stones for perches.
- Put up bird feeders and nesting boxes. See how to choose a bird feeder.
- Don't cut down the flowers of plants like sunflowers, coneflowers, and black-eyed Susans in the fall, as their seed heads provide a valuable food source for birds in winter.

6. Be Water-wise

Using water thoughtfully is a very important part of a pollination-friendly landscape.

- As advised above, select your plants with care! If you have a dry area, consider native plants that are more naturally drought-tolerant such as sedum and speedwell (*Veronica*). If you have a wet area, consider water-tolerant plants (that don't mind wet feet), such as iris, canna, and ferns.
- Avoiding wasting water. If you must use sprinklers, put them on timers. For gardens, flower beds, trees, and other nonlawn areas, installing a drip irrigation system that puts the water right into the soil, where you want it.
- Harvest your rain water. A rain garden collects rain water from a roof, driveway, or street and allows it to soak into the ground. Rain gardens can also help to filter out pollutants in runoff and provide food and shelter for butterflies, song birds, and other wildlife. See a "sun" and a "shade" rain garden plot plan.
- Alternatively, install a rain barrel to catch water and use it on your plants. See our post about rain barrels.
- Organic mulches such as compost slow water down, so that more moisture goes into the soil instead of running off. That said, leave a little bare ground so that the solitary bees and pollinators have places to nest. Read more about the "Benefits of Mulch."
- Finally, consider reducing the size of the all-grass lawn. Perhaps you could stop mowing one section and convert it to a native wildflower border or meadow?

7. Try Composting

Do you have spare room in the corner of your yard? Instead of throwing out vegetable scraps and yard trimmings, dispose of them in a compost pile. You'll encourage compost-making worms and bugs that will help to create a rich, fertile soil for your garden within months. It's a great way to use fallen leaves, too!

- We have the perfect compost recipe to get things cooking. See how to compost!
- There's also in-garden or in-situ composting, which is when you are composting directly where you're going to grow. See more about in-garden composting.
- Ever heard of vermicomposting? Just have worms eat your garbage! It's an easy way to recycle food waste indoors year-round. See how to vermicompost.
- If you have roses or ornamental gardens, consider "compost tea," which is a natural fertilizer to help plants thrive. See how to make compost tea.

8. Reduce, Reuse, Recycle

In general, caring about yourself and nature means being less wasteful. Who could argue with that? If you are a gardener, here are just a few ideas out of many:

- Buy in bulk when you know that you'll need a lot of topsoil, mulch, compost, or other materials. This cuts down on plastic bags. Many garden centers will even deliver right to your yard. Also check with your city recycling center or Department of Transportation; they might offer free compost, soil, sand, or other materials.
- Reuse, recycle, or return old plastic pots and trays. See six ways to reuse pots and containers.
- Make your own plant pots! See how to make biodegradable plant pots.

9. Give Grass a Chance to Thrive Alone

If you're going to grow grass, eliminate the chemical pesticides that you spread on lawns in favor of alternatives that are healthier—healthier for you, for the lawn, and for the environment.

- Start by checking the soil pH (acidity) of your lawn with a test kit available at most nursery and garden supply stores or at your state's cooperative extension service. Soil pH affects the ability of plants to absorb nutrients. Spread limestone to raise the pH level; spread aluminum sulfate to decrease the pH level.
- Grow grass that is suitable to your needs, not just in terms of climate and soil, but also with regard to purpose. Ask your nursery to recommend seed for grass that suits your site.
- Don't shave the lawn down to the ground; mow it to be 2.5 to 3.5 inches tall all season. Cut it to about 2 inches in autumn.

- And, if at all possible, use a hand mower, instead of an electric or gas model. You'll appreciate the freedom from fumes and noise and perhaps sleep more soundly after walking your property.

10. Leave Nesting Sites for Pollinators

Many insects hibernate for the winter and need a place to bed down. New queen bees are born in the fall. After breeding, they find a place to reside for the cold season, emerging in the spring and starting the next generation.

Hole-nesting bees and beetles need things like dead tree trunks or reeds to overwinter in. Leave some natural areas of your yard instead of landscaping every inch!

Work With Nature, Not Against It

As we hope you see, you can certainly achieve a great deal with small changes in your own "habitat." Also, support land conservation in your community when it comes to creating community gardens and green spaces.

You're supporting pollinators—and people!

'No Mow May' campaign asking us to leave the lawn alone until June to help save bees

By Positive Thoughts

May 13th, 2020

We're on lockdown and for some people who are trying to fight the boredom, gardening becomes a way to keep them busy. Part of their gardening activities would have to be mowing the lawn and trimming the grass, but did you know that you can skip this part if you wanted to see more flowers?

According to a study conducted by *Plantlife*, not mowing in May or simply doing the "No Mow May" challenge will actually result in a fuller lawn with more flowers to bless your sight every waking morning.

Through research conducted by *Plantlife* in the previous year, they asked citizen scientists across the United Kingdom to participate in a project called "Every Flower Counts". It is considered to be the largest survey ever done to study the lawns and it required some people to not mow their lawns throughout May.

It appears that there are indeed certain benefits in not mowing.

The huge number of flora found in lawns

Participants in “Every Flower Counts” who did not mow their lawns noticed a big variety in the flowers that grew in their gardens. The study concluded that about 200 species were found to grow in unmowed lawns and some of these are rare plants such as meadow saxifrage, knotted clover, and eyebright.

The study also noted that the top three flowers that grow on lawns are daisies, selfheal, and white clover. This was concluded after counting over half a million flowers, 191,200 of them are daisies.

The reduction in costs

Not mowing the lawn certainly results in lower costs, because people skip the regular mowing and therefore saves on the mowing cost for the month. It's not even a bad thing because leaving the lawn unmowed for May can result in better diversity and plant life in your garden, which makes it even prettier and more relaxing to look at.

The increased biodiversity

Did you know that not mowing the lawn can also increase the population of bees in your garden for up to 10 times? These bees are great pollinators and are actually the reason why not mowing can lead to more flowers! To quantify, “Every Flower Counts” found that 80% of lawns supported an equivalent of around 400 bees a day from the nectar sugar produced by flowers such as dandelion, white clover, and selfheal. But 20% of lawns, also referred to as “super lawns” were found to be supporting 10 times as many – or up to 4000 bees a day!

The staggering increase in nectar

More flowers also mean more nectar. After some people participated in the project, it was found that the first-ever National Nectar Score for lawns got to an all-time high. All lawn flowers in the survey combined produced a colossal 23kg of nectar sugar per day, enough to support 2.1 million – or around 60,000 hives – of honeybees.

Wow, those are quite the numbers!

After the study, *Plantlife*'s Botanical Specialist, Dr. Trevor Dines, explained how we can work things out to our advantage.

“In any garden, big or small, we’d now advise keeping two lengths of grass. Leave some patches completely unmown to let taller flowers come into bloom. For the rest of the lawn, you can keep the grass shorter by mowing once every month to a height of 1 or 2 inches. You’ll cut off some flowers when you do mow but they’ll come back quickly; you can even rotate patches around your garden so there are always some areas in flower. For flowers, bees and butterflies there is one lawn ‘haircut’ that really suits: the Mohican. Most should be given a monthly cut to boost short sward plants but there should also ideally be an area set aside for longer grass where floral diversity abounds.”

Ian Dunn, *Plantlife*'s CEO, has emphasized on how having a beautiful garden can be a sort of relief for people who are being stressed out because of the

pandemic if only they can keep themselves from mowing and try to participate in the project.

“With COVID-19 restrictions in place, many people are finding some solace in their gardens. Observing up close like never before wildflowers and the wildlife they attract. After a mild winter, spring has been superb for flowers like dandelions and daisies and, as tempting as it might be to get the mower out while on lockdown, these results highlight in bold the botanical jewels that reward patience. Parking the mower can be the best decision people can make this May as Every Flower Counts at the end of the month will show.”

You see, gardening and finding calmness through it doesn't have to be working on the lawn all day. This amazing initiative suggests that you can also find an incredible garden if you learn to just wait and let the grass grow taller.

All you have to do is observe and see if there will be beautiful changes and who knows, you might just see some rare flowers growing in your lawn, making it even more special and one-of-a-kind.

Please **SHARE** this with your friends and family.

No Mow May: Why you shouldn't mow the lawn in May

This summer sit back and let the grass grow, as a new campaign called No Mow May encourages gardeners to leave their mowers in the shed and transform their lawns into havens of biodiversity. Illustration Lesley Buckingham

By Daisy Bowie-Sell

Published: April 28, 2020 at 3:01 pm

The warming weather signals the point in the year when gardeners are able to turn their attentions back to their lawns, with regular mowing transforming a scrappy patch into an orderly sea of green.

The connection between mowing and the beginning of the gardening season is deeply entrenched in the psyche of gardeners, which is why No Mow May – the idea of avoiding mowing in May, suggested by charity Plantlife – is quietly revolutionary. Over the colder months, lawn maintenance mainly involves ensuring that mower blades are clean and sharp. But once spring begins to break through, regular cutting is high on the agenda. May is the window to summer and the point at which the once-dormant grass starts to shoot up in earnest and mowing traditionally gets under way. Most gardeners are desperate to get out and start chopping, and Plantlife's recent survey of 2,000 gardeners revealed that most of us mow once every two weeks.

The reason for thinking twice about our mowing habits comes down to stark facts. According to a report in the journal *Biological Conservation*, 97 per cent of British wildflower meadows have disappeared since the 1930s. A recent study published in the journal *Nature Communications* shows that many British pollinating insects are in decline, with rarer species, such as the red-shanked carder bee, really struggling. Between 1980 and 2013, every square kilometre in the UK lost an average of 11 species of bee and hoverfly. The reasons behind this are the use of insecticides, habitat loss and an overall reduction in biodiversity. Plantlife believes that people's gardens can play a vital part in reversing this trend.

Mowing tips for encouraging wildlife

Cut once every four weeks The 2019 No Mow May experiment revealed the highest number of flowers on lawns mown in this way. Ideally, leave around three to five centimetres of grass length.

Leave areas of long grass The experiment also resulted in greater diversity of flowers in areas of grass that were left completely unmown, with oxeye daisy, field scabious and knapweed offering up important nectar sources.

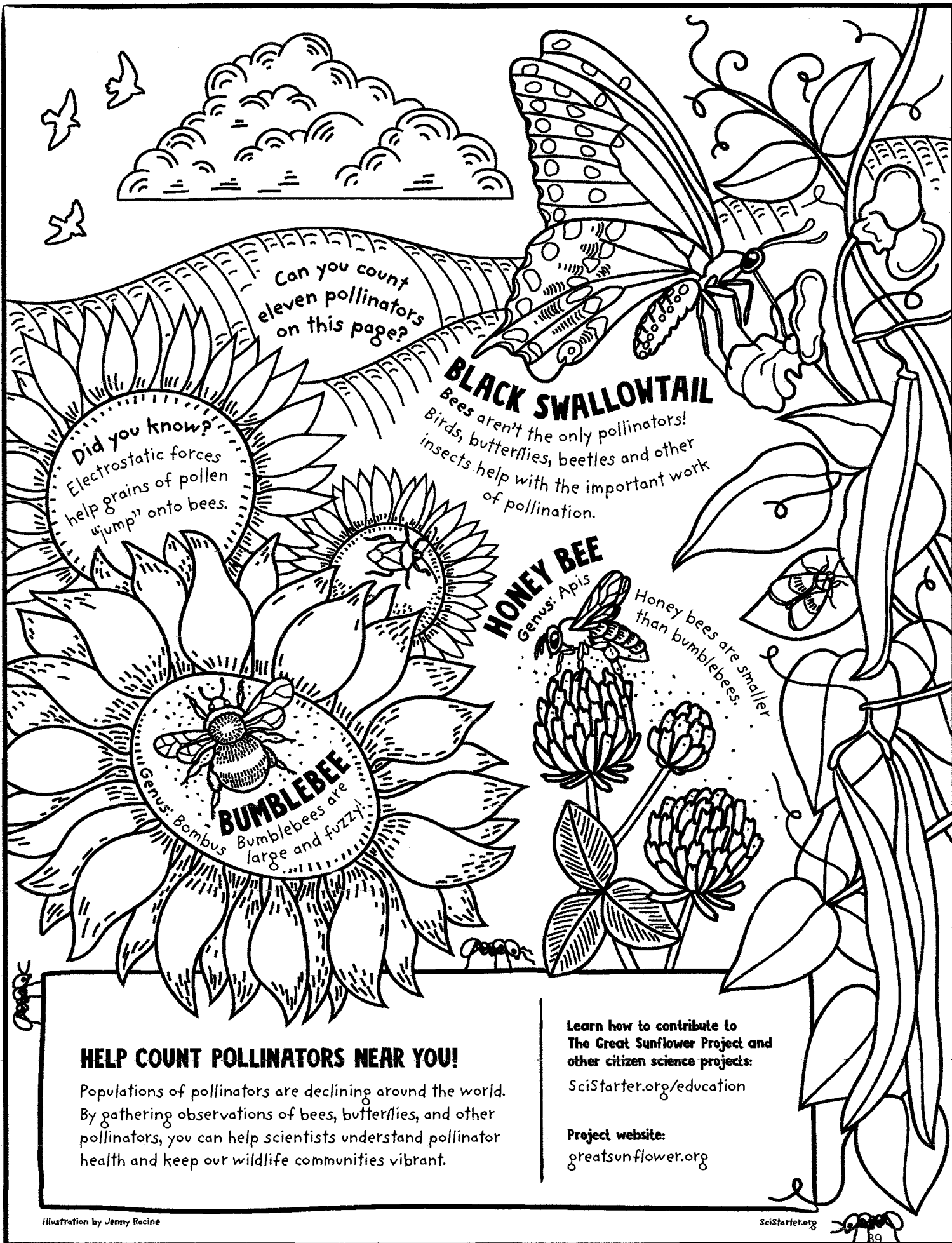
You don't have to stop mowing completely. Some species, such as daisy and bird's foot trefoil, are adapted to growing in shorter swards. Cutting flowers from these plants once a month stimulates them to produce more blooms.

And it's not just a belief: there's now proof. Following the launch of No Mow May in 2019, figures show that if you mow less, the pollen count on your lawn can skyrocket. The charity's citizen science experiment asked people to leave their mowers in the shed for May and count the flower species that subsequently popped up in a one-square-metre patch of their lawn. The results are indisputable: changing the way we mow can result in a tenfold increase in the amount of nectar available to bees and other pollinators. The new mowing regime saw an increase in the growth of daisies, germander, speedwell and creeping buttercup. And the species that benefitted changed each month – after stopping mowing for another month in July, participants saw a resurgence of white clover, selfheal and bird's foot trefoil. The average square-metre patch of lawn surveyed after the experiment produced enough nectar to support almost four honey bees per day.

For Plantlife's botanist Trevor Dines, it's a case of changing the way we all think about how we control our gardens. "It's time for people to relax a little bit," he says. "Avoiding mowing in this way means that instead of a dull monoculture of green concrete, your garden will be thriving and full of interest. I don't think people realise how diverse our lawns can be."

And the option to continue as we have been is not really a viable one. "The statistics for wildflower meadow loss are shocking: around 7.5 million acres have gone," says Trevor. He describes how a colleague's grandfather used to walk from Stratford-upon-Avon to Birmingham as a boy and not leave a wildflower meadow. "The loss of this landscape means a loss of food source for pollinators, which is one of the key drivers of their decline."

It's not necessary, either, to simply leave your garden to the elements. The ultimate concept of No Mow May is not really to stop mowing in May specifically, or to leave whole swathes of your lawn unmown. Behind the catchy title is a simple concept: get people to change their habits so that they mow less – ideally once a month – and possibly even leave a patch or two of grass to grow long. Gardens can really make a difference to the number of wildflowers in this country. As Trevor says: "We've lost the mosaic of meadows from the countryside but at least within our gardens we can do something in response to that."



Can you count
eleven pollinators
on this page?

Did you know?

Electrostatic forces
help grains of pollen
"jump" onto bees.

BLACK SWALLOWTAIL

Bees aren't the only pollinators!
Birds, butterflies, beetles and other
insects help with the important work
of pollination.

HONEY BEE
Genus: Apis

Honey bees are smaller
than bumblebees.

BUMBLEBEE
Genus: Bombus
Bumblebees are
large and fuzzy!

HELP COUNT POLLINATORS NEAR YOU!

Populations of pollinators are declining around the world.
By gathering observations of bees, butterflies, and other
pollinators, you can help scientists understand pollinator
health and keep our wildlife communities vibrant.

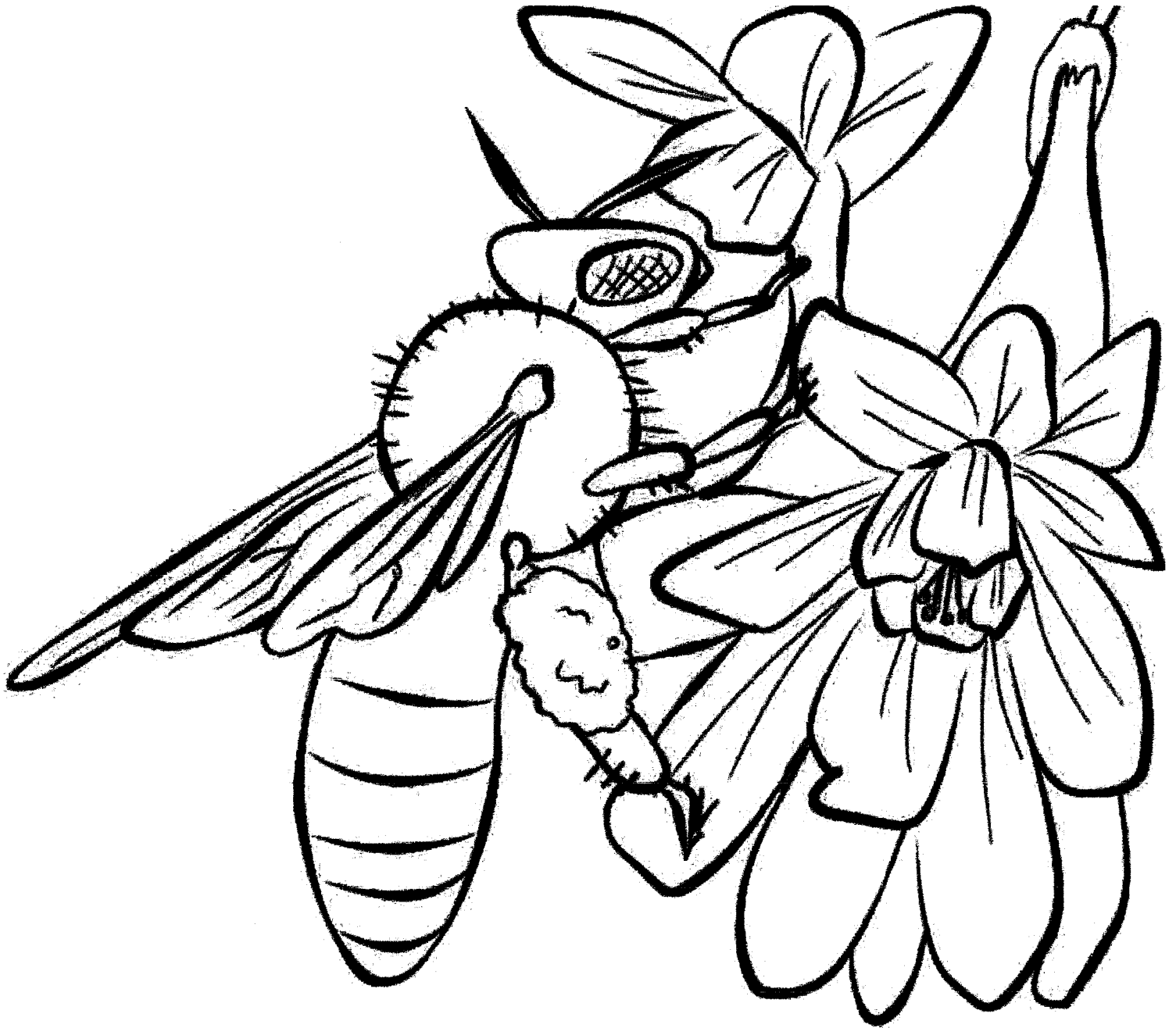
Learn how to contribute to
The Great Sunflower Project and
other citizen science projects:

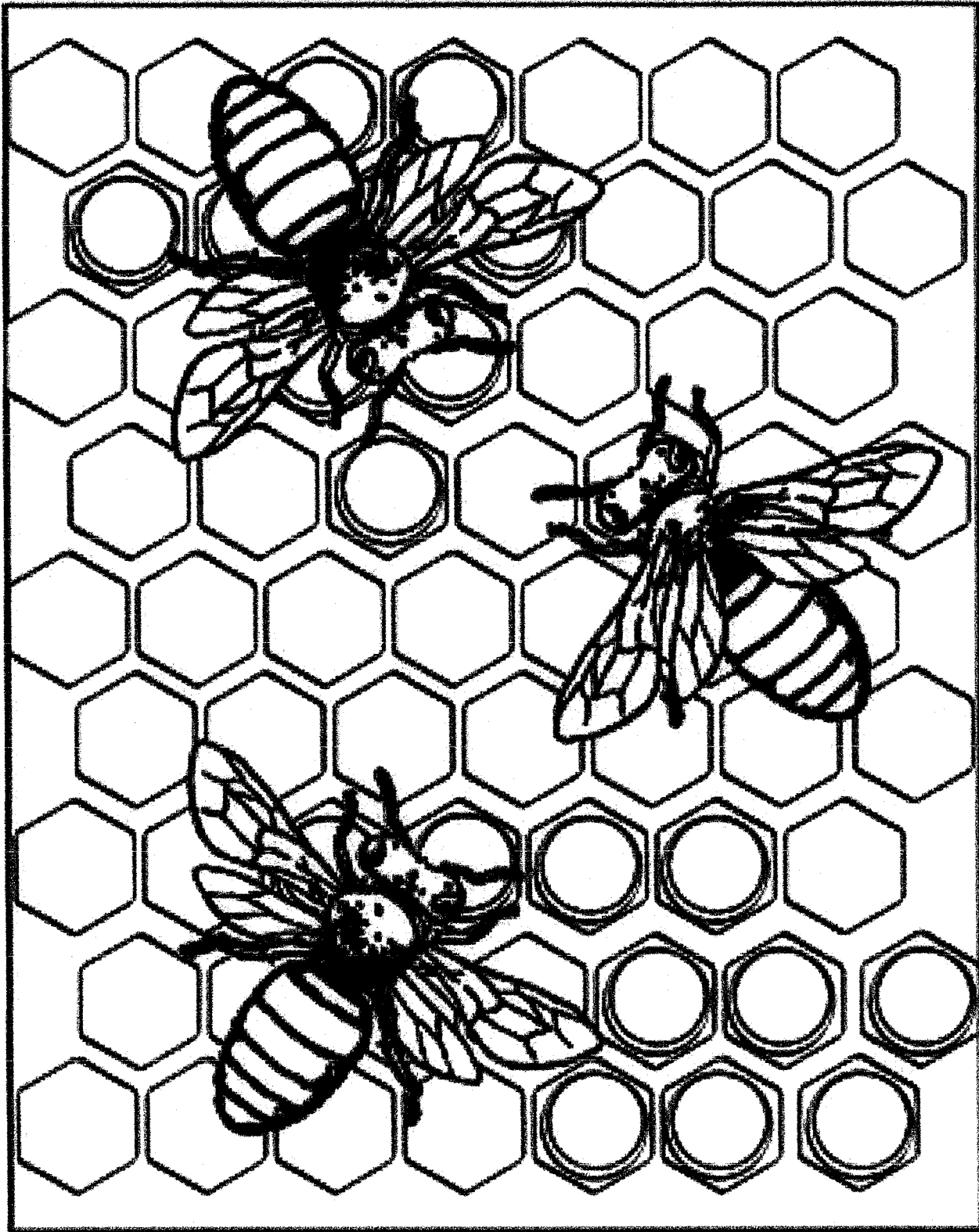
SciStarter.org/education

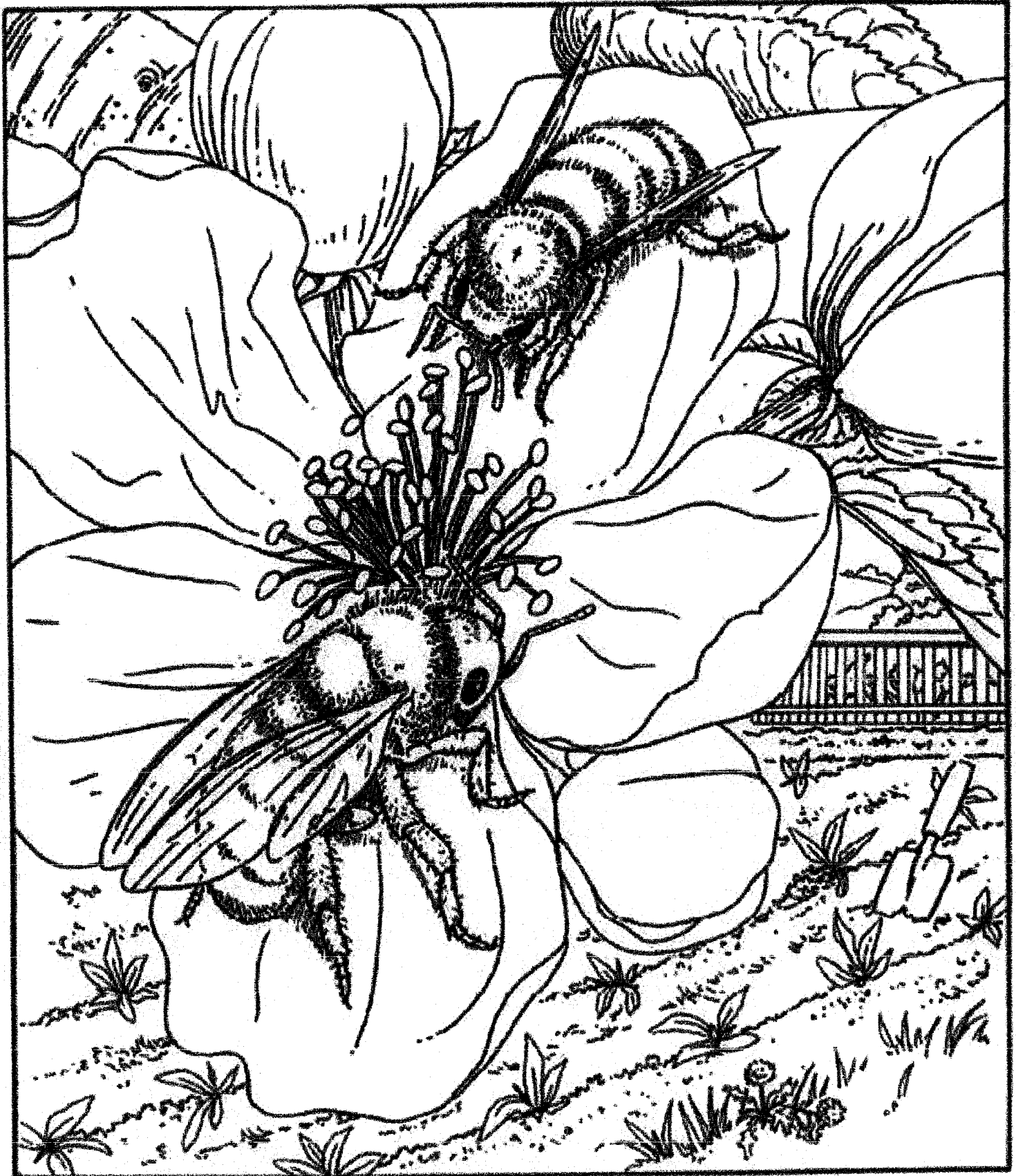
Project website:

greatsunflower.org



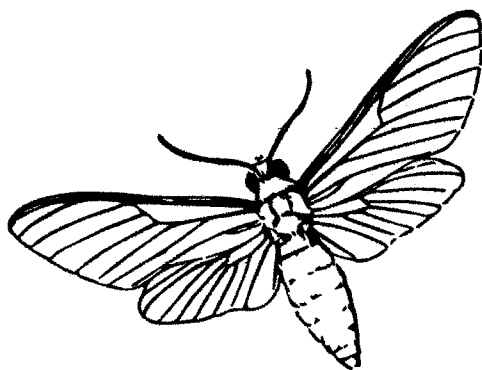
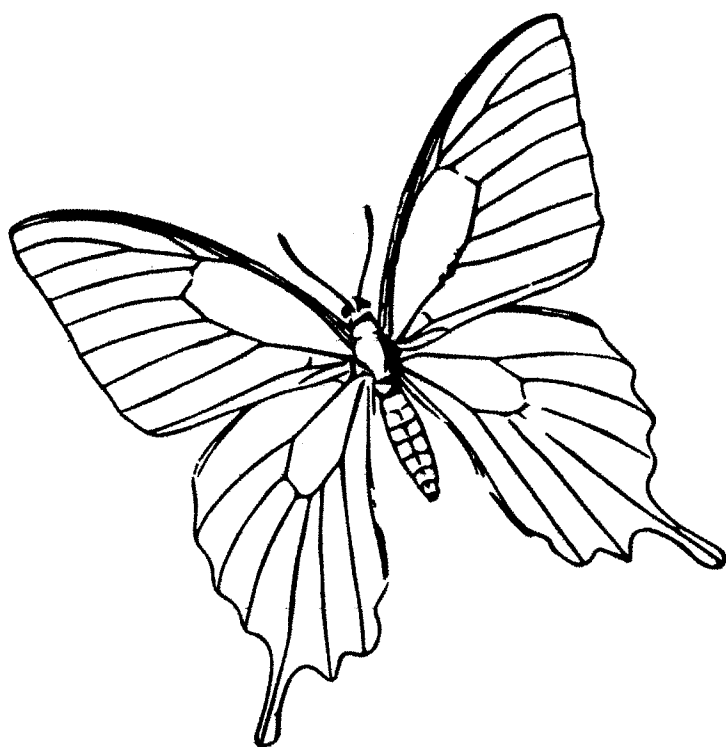
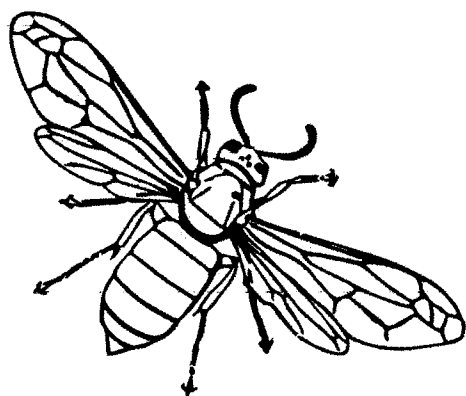








BEE yourself



Mason Bee (Osmia)



The genus *Osmia* includes some of the most economically important bees in North America, responsible for pollinating many orchards and fruit crops, and for picking up the slack when honey bees fall short. Some species will build nests entirely from mud, thus earning them the common name 'Mason Bees'. To learn more about mason bees and their relatives, check out "[The bees in your Backyard](#)" by Joseph Wilson and Olivia Carril.