

## Wild Wednesdays

### Week 4: *Pollinators: Spotlight on Bees*

By Hara Woltz

Welcome to the fourth week of Wild Wednesdays! Last week's lesson, [Pollination Appreciation](#), introduced the intertwined relationship between pollinators and plants. Plants and pollinators have a beneficial relationship called mutualism, in which both the plant and the pollinator receive benefits from the other. Humans and other animals receive amazing benefits from this relationship between pollinators and plants as well. In the U.S. alone, scientists estimate that the economic contributions of bees add up to around \$15 billion dollars each year. Almost 90% of the world's flowering plants depend on some sort of animal pollination, including 75% of agricultural crops.

May 20 is [World Bee Day](#), making today the perfect day for a close-up look at bees. Established by the United Nations in 2017, this day was picked as the day to celebrate bees because it is the birthday of [Anton Janša](#), a pioneering 18<sup>th</sup> century beekeeper and bee advocate. Because threats to bee survival include pesticide use, habitat loss, and climate change, bees need all the advocates they can get.



#### **A FEW FASCINATING BEE FACTS**

Let's dive deeper into why scientists and citizens worry about pollinators. About 35% of insect pollinators, including butterflies and bees, are currently threatened with extinction. Some of the biggest problems for bees include loss of habitat, loss of variety of plants, higher temperatures connected to climate change, and insecticide use.

Sometimes when I read facts like this, the scale of the problem seems bigger than I can take on as an individual. But there is always something that you can do to help. There are programs around the country that are [building pollinator pathways](#) through the work of individuals. Lots of bee advocates are doing amazing things. The [Xerces Society](#) and [Native Beeology](#) are full of suggestions for things that you can do to help bees.

## DEEP DIVE WITH BEES

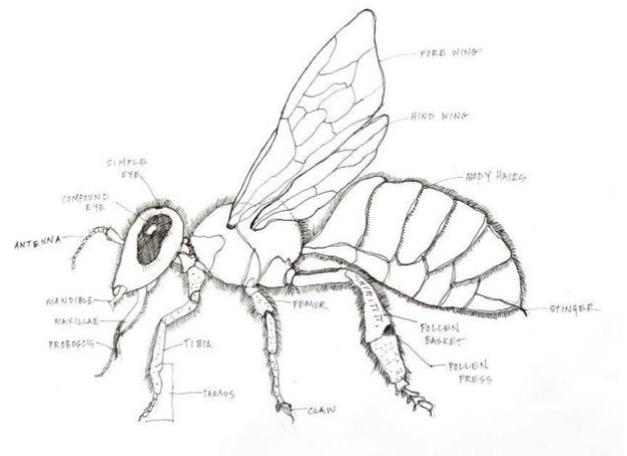
Today we are going to do a two-part investigation of bees. First, we'll look at bee anatomy, and then we will go outside and look at bees in their habitats.

### MATERIALS NEEDED

- Nature Journal
- Tape or glue stick
- Scissors
- Pen or pencil
- Markers or colored pencils
- Printer

### PART ONE: ANATOMY AND DIVERSITY

First, let's learn about bee anatomy. On the right is a drawing that I made by looking at a published anatomical drawing of a bee by Diana Sammatoro. I used Sammatoro's illustration to create a base for investigation. Follow this link and print out the pdf with three copies of my drawing. Cut out the images and tape or glue your copy of my drawings into your nature journal, or you can copy my drawing into your journal by hand. Number the copies in your journal 1, 2, and 3.



### COPY ONE (REFERENCE)

- After you have taped or drawn this in your nature journal, leave one copy blank for reference.
- See if looking at this drawing brings up any questions for you. For me, looking at this drawing makes me want to know more about how bees carry pollen in their pollen press and pollen baskets. I want to know more about why some bees have fuzzy hairs, and some don't. I write these questions down on my drawing to remind me to do some research about this later.

### COPY TWO (POLLEN)

- Add pollen to copy two. Using orange and yellow colors, add some color to your bee. Imagine that your bee has visited several flowers, and filled its pollen baskets. What does the bee look like on the flight home?
- As bees fly from plant to plant, they collect pollen in pollen baskets on their rear legs or abdomens to bring back to their nests. They do this by grooming and brushing the pollen stuck to their bodies down to their



hind legs where it sticks to hairs in the pollen basket. In addition to filling their baskets, bees also get covered in pollen!

- As bees fly around filling their [pollen baskets](#), pollen stuck on their bodies is transferred from flower to flower. The bees then fly home to feed pollen to their larva.

### **COPY THREE (SPECIES DIVERSITY)**

- Pick a native bee to investigate and try coloring copy three to look like a native bee. Below are some native bee images taken by biologist Sam Droge that might inspire your coloring, and a link to many [more beautiful bee photographs](#). There are more NY and CT native bee images [here](#). Connecticut is home to around 350 species of native bees. And, in New York, there are around 415 species of native bees. There are also many non-native bees that live here, including the European honey bee.
- In the United States there are around 4000 native bee species. Native bees come in a variety of shapes and sizes and colors. There are large bees such as bumble bees and small bees such as green sweat bees.
- Though honey bees and bumble bees live in communal hives, many other species of bees live solitary lives. Of these non-hive dwellers, about 30% live inside of plant stems including tree trunks, and about 70% live underground.



### **PART TWO: BEE BEHAVIOR**

Bees use different senses to find flowers. They have olfactory (smell) receptors on their antennae, and some bee species are able to smell their preferred flowers from two miles away! Bees also use their sight to find flowers and the pollen rich centers of flowers. Bees have two sets of eyes, simple and compound. Although there is some overlap between what bees and humans are able to see, bees are also able to see ultraviolet light. This sight helps bees find their way to the pollen in flowers.

A lot more information about bee vision can be found [here](#).

Let's go outside and investigate. Choose a nice day, not too windy or cold, and find a place where you will be able watch bees visiting flowers.

**A Note:** *If you, or anyone you are with, has a bee allergy, make sure you take precautions before getting close to pollinators.*

When we work in our nature journals, we often focus on what we see, but you can use a combination of your senses to observe the world. Pollinators use a combination of smell and sight to find flowers. Take a walk around the area you plan to observe and let your nose guide you. Make some notes about what you smell. Are there particular plants in bloom that draw you in with their scent? If I were a pollinator, I might be spending a lot of time in crabapple and cherry blossoms right now. Both are in bloom where I am, and when I get close to them, I can smell a sweet, dusty scent.



### **STEP ONE: Go Outside**

- Bring your nature journal, a pen or pencil, and some colored pencils or markers.
- Go outside, or if you can't get outside, you can do this from a window with plants nearby.

### **STEP TWO: Observations**

- As we learned in [week two](#), your location, the weather, the time of year, and the time of day can have a big impact on what you observe. Pick a corner of your journal page and make some notes that include:
  - **Location:** Record information about where you are making these observations.
  - **Date:** Day, month, and year.
  - **Time:** Time of day.
  - **Weather:** I usually include the temperature, the cloud situation, whether it is sunny, rainy, or snowy, and how windy it feels. You can make some general notes about what you see, and you can also look up the weather for your area online, or use a backyard thermometer if you have one.

### **STEP THREE: Investigate your space and search for bees.**

- Do you see any bees? Look closely, some of them might be tiny.
- Look carefully around for any plants that might be flowering.
- If you do see bees on a certain plant, how many do you see?
- Pick one bee to pay attention to for a few moments.
- Can you see what the bee is doing?
- How long does the bee stay on a particular flower?

- Does it move around to other flowers?
- Is there one plant or flower that has more bees around it than others, what do you think it is about this flower that makes it the most attractive to bees?
- In what direction does the bee fly when it leaves?
- Are all the bees that you see flying in the same direction?
- Make a sketch of what you see, noting colors and action.
- Draw this scene in your nature journal, including notes.
- Try to draw the paths of individual bees using dots or dashes or lines.
- What do you think it is about this flower that makes it the most attractive to bees?

Here's an example from my nature journal. I focused on a crabapple tree that is in bloom where I am. After looking and sketching, I decided to set a timer for five minutes and follow the pathways of three different bees.

