

Day 4

Bugs in Our Lives





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Introduction

It's a good thing there are so many insects, because they have a lot of work to do! They play an important part in most [food webs](#) — at the beginning as a [primary consumer](#) and at the end, as a [detritivore](#). When insects eat dead organisms, they help return nutrients to the soil so plants can use them to grow. This day focuses on how insects help with [decomposition](#), or the decay or breakdown of dead organisms. It also focuses on another job insects do that is important for food production: [pollination](#). In order for many plants to produce fruits, vegetables, and nuts, they need an animal's help. These insect jobs show their important role in [their ecosystems](#). Other animals and plants depend on them to grow, reproduce, and help keep a balance within the ecosystem.

Questions to guide explorations and experiments

- What is pollination?
 - How do insects help in pollination?
 - Which insects are pollinators?
 - What is ecological balance?
 - What is decomposition?
 - How does decomposition help an ecosystem?
 - How do insects help with decomposition?
 - Which insects help with decomposition?
-

Books and activities

- **Books:** all about pollinators, especially bees, ecosystems, and decomposition
- **Activities:** learn about how insects pollinate plants and plant anatomy, how insects help with decomposition, and how to plant a garden that supports insects



Fiction

- *A Bear, a Bee, and a Honey Tree* by Daniel Bernstrom (ages 3-7)
- *The Bee Tree* by Patricia Polacco (ages 4-8)
- *Because a Little Bug Went Ka-Choo* by Rosetta Stone (ages 2-5)
- *Camilla, Super Helper* by Judy Dillemoth, PhD (ages 4-8)
- *Doug's Dung* by Jo Rooks (Ages 4-8)
- *I Eat Poop: A Dung Beetle Story* by Mark Pett (ages 4-8)
- *100 Bugs! A Counting Book* by Kate Narita (ages 5-7)
- *A Web* by Isabelle Simler (ages 5-10)

Poetry

- *Behold Our Magical Garden: Poems Fresh From a School Garden* by Allan Wolf (ages 8-12)
- *Butterfly Eyes and Other Secrets of the Meadow* by Joyce Sidman (ages 6-12)
- *The Mighty Pollinators* by Helen Frost and Rick Lieder (ages 2-6)
- *UnBEElievables: Honeybee Poems and Paintings* by Douglas Florian (ages 4-8)

Nonfiction

- *An American Plague: The True and Terrifying Story of the Yellow Fever Epidemic of 1793* by Jim Murphy (ages 10-14)
- *A Day in the Life of Bugs* by Dr. Jessica L. Ware (ages 8-12)
- *Bee Dance* by Rick Chrustowski (ages 4-8)
- *Begin with a Bee* by Liza Ketchum, Jacqueline Briggs Martin, and Phyllis Root (ages 5-10)
- *The Book of Brilliant Bugs* by Jess French (ages 8-12)
- *Bugs and Us* by Patricia J. Murphy (ages 5-7)
- *Give Bees a Chance* by Bethay Barton (ages 4-8)
- *Insects: The Most Fun Bug Book Ever* by Sneed B. Collard III (ages 9-12)
- *Groundhog Day* by Gail Gibbons (Ages 4-8)
- *Not a Buzz to Be Found: Insects in Winter* by Linda Glaser (ages 5-8)



Activity 1: Decomposition: Get Down to Earth

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Introduction

Insects are an important part of their [ecosystems](#). They are part of food chains and webs both at the beginning and the end. At the end of an organism's life, it decays or [decomposes](#). That means it breaks down into little pieces that can be absorbed back into soil. This process keeps soil healthy and helps plants grow. Many insects are [detritivores](#). They eat dead organisms or their waste. They work with other detritivores including [fungi](#), molds, [bacteria](#), and some animals such as vultures and hyenas, to help dead things decompose and enrich the soil. Detritivores' waste has nutrients like the minerals plants need for photosynthesis.

Cockroaches, beetles, ants, some butterflies, and maggots (aka fly larvae) are examples of insect detritivores. The dung beetle is known for creating balls of animal poop and rolling them home to feed their babies! Over time, the detritivores work with the sun and water to return nutrients from dead plants and animals to the soil by eating and pooping. Some also help improve soil by digging, breaking it up and mixing in nutrients. You can see how things decompose by watching carefully, and you can help detritivores by creating compost.



Supplies

To observe decomposition

- 3 clear jars with lids
- 3 apple or pear cores (Slice up the fruit and use as a snack for kids)
- A piece of nylon screen or cheesecloth
- A rubber band



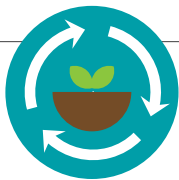
Activity 1: Decomposition: Get Down to Earth

For the composter

- Clean, empty 2-liter plastic bottle with label removed
- 3 apple or pear cores (Slice up the fruit and use as a snack for kids)
- Scissors or craft knife
- Nail
- Dirt from outside, not potting soil
- Shredded newspaper or torn paper bags
- Dry leaves, small sticks, or pine needles
- Fruit or veggie scraps, egg shells, coffee grounds, or grass clippings
- Flat dish to hold the composter
- Spray bottle with water
- Long-handled spoon



Image: PBS Parents (<https://www.pbs.org/parents/crafts-and-experiments/make-a-composter>)



Activity 1: Decomposition: Get Down to Earth

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Get kids thinking ...

Ask: Have you ever rolled over a log or lifted up a rock in the woods and seen insects, roly polys, or worms underneath? Have you ever seen mushrooms in the woods or mold on an apple core? What do you think was happening with the insects, the log, the apple core, or the soil?



Remind kids about [food webs](#) and how insects are important at the end because they return [nutrients](#) to the soil when they eat dead organisms or waste. The plants use the nutrients in [photosynthesis](#). In this way insect [detritivores](#) are the link between the end of one food chain or web and the beginning of another!

Let's get started!

Start with a book! Read "The FBI of Compost" from *Behold Our Magical Garden: Poems Fresh From a School Garden* by Allam Wolf or *The Book of Brilliant Bugs* by Jess French (pages 38-39 and page 73).

Get kids brainstorming what the FBI (Fungi, Bacteria, and Insects) need to do their jobs as detritivores. **Ask:** What would be the best conditions or environment for them? How do insects get to dead plants or animals? How do they get to food scraps? How can they help make better soil for plants near them? Help kids get a handle on what happens by having them observe some decomposition.

Part 1: Observe decomposition

Step 1: Slice up three apples or pears. Kids can eat the slices for a snack. Put each of the remaining cores into separate jars. Label each jar: Jar 1, Jar 2, Jar 3.

Step 2: Leave Jar 1 uncovered, put the nylon screen or cheesecloth over Jar 2 and attach it with the rubber band, and screw the lid tightly on Jar 3.



Activity 1: Decomposition: Get Down to Earth

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Step 3: Invite kids to make predictions about which core will decompose first and have them write their predictions in their Bug Journals.

Step 4: Put these jars outside in the same place. Observe the jars every day. **Ask kids:** What do they see? What is happening to the cores? Do they see any insects or mold? Have kids write their observations in their Bug Journals.



Step 5: At the end of your observation time (at least 5 days), which core has decomposed most? The least? **Ask kids:** Why do they think that is so? Were their predictions correct? Invite them to write and draw in their Bug Journals. Discuss with kids how the lid or the screen would affect decomposition.

Part 2: Make a composter

Kids can observe decomposition on a bigger scale when they make a composter out of a plastic 2 liter bottle.

Step 1: Since the cutting and poking may be tricky for kids, provide them with a 2-liter bottle with the top cut off (approximately 1–2 inches below the neck of the bottle), and about 10 small air and drainage holes that you punched with a nail along the sides and bottom of the bottle. Set the top aside.

Step 2: Kids should put the empty, prepared bottle on a dish or plate. Have them add some dirt, shredded newspaper, and dead leaves to the bottom of their bottle. Give them a spray bottle to wet the newspaper and leaves. This is the compost starter.

Step 3: Have kids add materials to compost. They can layer grass clippings, fruit and vegetable peels and scraps, coffee grounds, or eggshells, **but should not add dairy or meat.**

Step 4: Kids should take the top of the bottle that you cut off, turn it upside down, and place it in the opening of the bottle. Let kids know that this will act like a funnel for adding a little bit of water each day to keep the contents damp.

Step 5: Invite kids to draw the composter in their Bug Journals and label the items they put in it.



Activity 1: Decomposition: Get Down to Earth

Ask them how they think water and aeration holes will affect decomposition in their composter and to write down their ideas. If you've done the **Part 1: Observe decomposition** activity, remind them to think about how the cores in different jars decayed at different rates.

Then ask them to predict what will happen to the material in their composter.

Step 6: Have kids find a place for their composter outside where sunlight can reach it and schedule a composter check day. Have kids note (and draw) their observations about what the daily changes and smells are like in their Bug Journals.

Every few days, have kids stir the compost and add a little water, if needed, to keep the compost damp. As the compost breaks down, kids can add more food scraps or plant litter, as well as some more dirt.

Step 7: At the end of your observation time, ask kids to look back at their predictions and see if they were correct. Have them describe, in their Bug Journals, how the contents of the composter have changed. What do the food scraps, leaves, and paper look like now? Do they see insects or mold? What role did sunlight or water play?

It's okay if not a lot of changes happened. Decomposition takes time. If possible, let the composters work for several weeks for kids to see the process.

Step 8: If compost turns into healthy soil, add it to a nearby flower bed or garden or have kids place it in a pot, add a seed and some water and grow something new!





Activity 1: Decomposition: Get Down to Earth

More activities about decomposition

Be a Decomposition Helper, Too! (scroll to end)

<https://kidspacemuseum.org/for-families-at-home/decomposition/>

Decomposition Mission

<https://beetlesproject.org/cms/wp-content/uploads/2021/07/Decomposition-Mission.pdf>

Make a Log Hotel

<https://kidsgardening.org/wp-content/uploads/2022/11/Decomposition-Activity-Pack.pdf>

Why Recycling Matters: Some Things Don't Decompose

<https://www.whizzpopbang.com/blog/easy-science-for-kids-decomposing-experiment/>



Interior spread from: *Behold Our Magical Garden:
Poems Fresh from a School Garden* by Allan Wolf

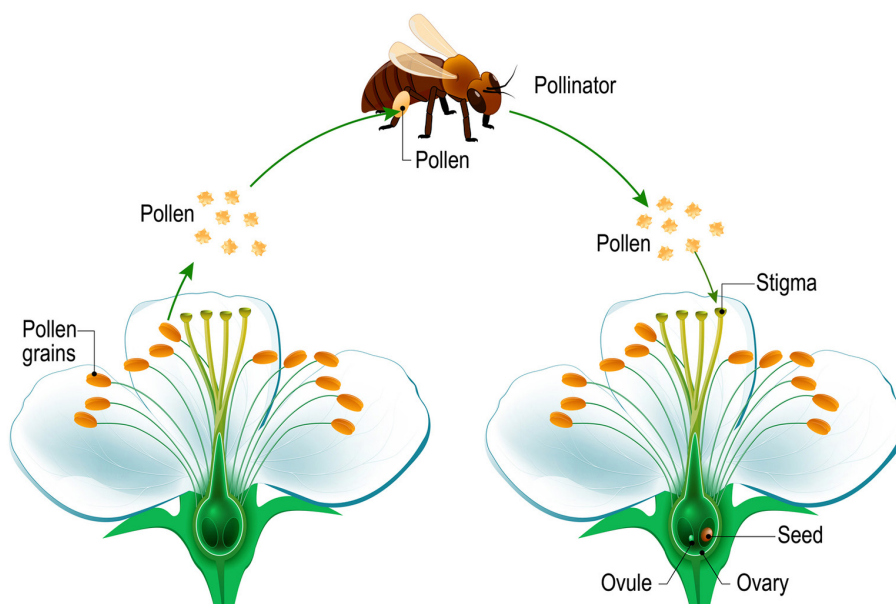


Activity 2: Pollination: Be a Bee

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Introduction

If you like apples, berries, peaches, avocados, many kinds of nuts, or vanilla ice cream, thank a bee! Bees and other insects pollinate many plants by moving pollen from one blossom to another. **Pollen** is a fine powder produced by some plants for reproduction. **Pollination** is when pollen grains move from the **anther**, where pollen granules are made, to the **stigma**, where they help to make seeds for new plants.



Apples come from trees with apple blossoms. Bees and other organisms help pollinate the apple blossoms. Apples, with seeds inside them, grow out of the pollinated apple blossoms. Someone or something eats the apple and some of the seeds end up in the ground. Those seeds can grow into a new apple tree.

Bees and other pollinating insects and animals are responsible for making some of our favorite foods. For example, bees pollinate alfalfa (a grass eaten by dairy cows) and vanilla. The cows make milk and other dairy products. People use cream and vanilla to make ice cream. Other animals, like bats, hummingbirds, and some badgers, pollinate plants, too, but insects do the most pollinating. Without them, we wouldn't have many of our favorite foods.



Activity 2: Pollination: Be a Bee

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There are more than 20,000 solitary bees native to North America. They live alone and they don't make honey, but they are important pollinators. Some bees, like the European honeybee, brought to North America in the 1600s, live in groups. When a honeybee finds a good source of pollen, it returns to its home, the **hive**, and tells the other honeybees where it is. The honeybee does a **waggle dance** that tells the other honeybees which direction to fly and how far. They also share some of the nectar they've gathered with the other honeybees so they know what the flowers smell like.

Sometimes it is hard for pollinators to find the plants they need. Some places don't support insect habitats because they lack plants or water. Some places have lots of air pollution that hurts insects' ability to smell flowers. It's important to protect insect habitats so pollinators can do their job.

Supplies

Bees and static electricity

- Balloons
- Paper
- Wool scarf or polyester material

Learn the parts of a flower

- Cotton swabs
- Markers or colored pencils
- Flowers: The best flower types for this activity include lilies, tulips, daffodils, alstroemeria, gladiolus, iris, hibiscus
- Parts of a Flower identification sheet (pages 78–79)
- Paper or journals for drawing
- Flower Dissection sheet (page 80)
- Tweezers
- Scissors
- Tape



Activity 2: Pollination: Be a Bee

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Get kids thinking ...

Ask:

- Have you ever looked closely at a flower? What did you see?
- Have you ever seen an insect, like a bee or butterfly, on a flower? Why were they there?
- What happens when an insect visits a flower?
- What is pollen and how does it work?

Let's get started!

Start with a book such as *Bee Dance* by Rick Chrustowski or *The Book of Brilliant Bugs* by Jess French, pages 34–35, or *UnBEElievables: Honeybee Poems and Paintings* by Douglas Florian. Discuss with kids how insects moving from plant to plant carry pollen with them and pollinate the plants. Have them brainstorm ways the insects could carry the pollen, which is like a powder.

Ask: Have you ever walked across a room and gotten a shock when you touched the doorknob? Has your hair ever stood up after you pulled off a wool hat? ***That was static electricity!***

Static electricity is the buildup of the electrical charge in an object when it is rubbed against another object. It can make things stick together or push apart. One of the ways a bee collects **pollen** is with static electricity. They create static electricity on their bodies when they fly. Pollen sticks to their bodies because of the static electricity.

Bees have **scopa**, or areas on their back legs or abdomen with a long fringe of hair, where they collect the pollen as they move from flower to flower. They move pollen from plant to plant, pollinating as they go. Honeybees also bring the pollen and nectar back to their hives to make honey, feed the baby bees, and care for the queen bee.

While bees are moving from flower to flower, they end up moving pollen to the part of the flower that needs it to make seeds. This is **pollination**.



Activity 2: Pollination: Be a Bee

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Part 1: How bees use static electricity to collect pollen

Let kids test how static electricity makes things, like pollen, stick!

Step 1: Provide kids with a piece of paper from the recycling bin and have them tear it up into tiny pieces. Have them spread out the pieces on a flat surface, like a table or the floor.

Step 2: Help kids blow up a balloon and tie it closed.

Step 3: Have kids rub the inflated balloon back and forth on clean dry hair 4 or 5 times, or rub the balloon on a wool scarf or polyester material.

Step 4: Ask: What will happen when you put the balloon near the little pieces of paper? Have them write their ideas in their Bug Journals.

Step 5: Have kids hold their balloon near to, but not touching, the paper pieces and watch what happens. **Ask:** Why did the little paper pieces leap to the balloon and stick to it? Talk about how this is similar to the way pollen grains can leap off the anther of a flower and stick to the body of a bee.





Activity 2: Pollination: Be a Bee

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Part 2: Learn the parts of a flower

Step 1: Set out the flowers you have so that kids can get an up close look, giving one to each kid if possible. Provide kids with the Parts of a Flower identification sheet. Have kids use the sheet as reference to identify the anther, where the grains of pollen are, and the stigma, where pollen grains end up and then become seeds, on the flowers.

Step 2: Give kids a cotton swab to use as a pollen basket. Have them rub the swab on anthers of their flowers to see how much pollen it picks up. Let them compare their pollen baskets with others. Ask them to note which flowers have the most pollen.

Step 3: Provide kids with the Flower Dissection sheet and tweezers and scissors to carefully take apart their flowers. As they separate the parts of their flowers, kids should draw or draw or tape the actual parts of the flower as they find them and identify them.

Step 4: Ask: If kids are dissecting different kinds of flowers, have them compare what they found. How are the same parts of different flowers the same or different? Are they different sizes, shapes, or colors? Discuss what they think makes their flowers attractive to pollinators.

Step 5: Finish by watching a video about the bees' waggle dance and then invite kids to come up with their own waggle dance to show others where to find flowers. You may want to note that bees can sense the electric field that surrounds a flower, which could make for interesting dance interpretations!





Activity 2: Pollination: Be a Bee

More activities about pollination

Bee pollinator activities

https://dnr.maryland.gov/wildlife/Documents/LatH_Bee_Pollinator_Activities.pdf

Fruit dissection (Fruit can be a snack when kids finish the activity)

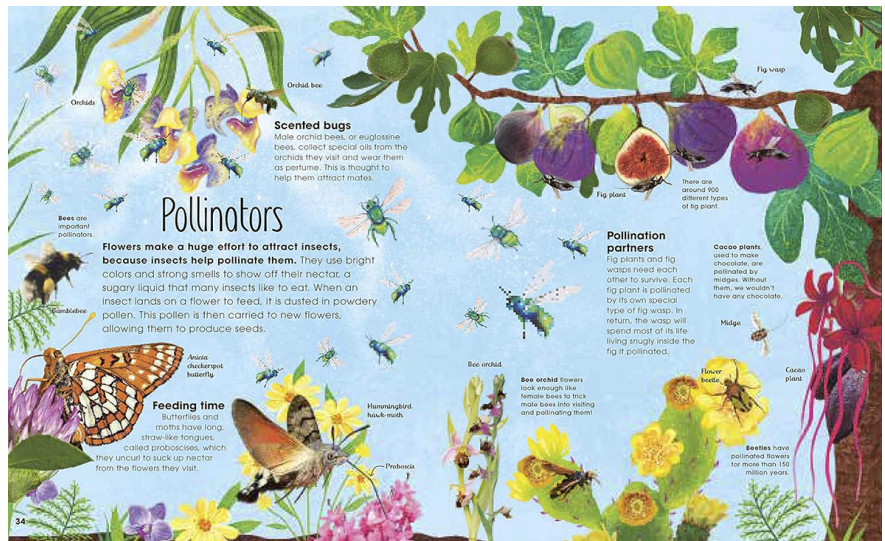
<https://www.exploratorium.edu/snacks/fruit-dissection>

Waggle Dance Game

<https://www.pbslearningmedia.org/resource/plumrx-sci-waggledance/waggle-dance/>

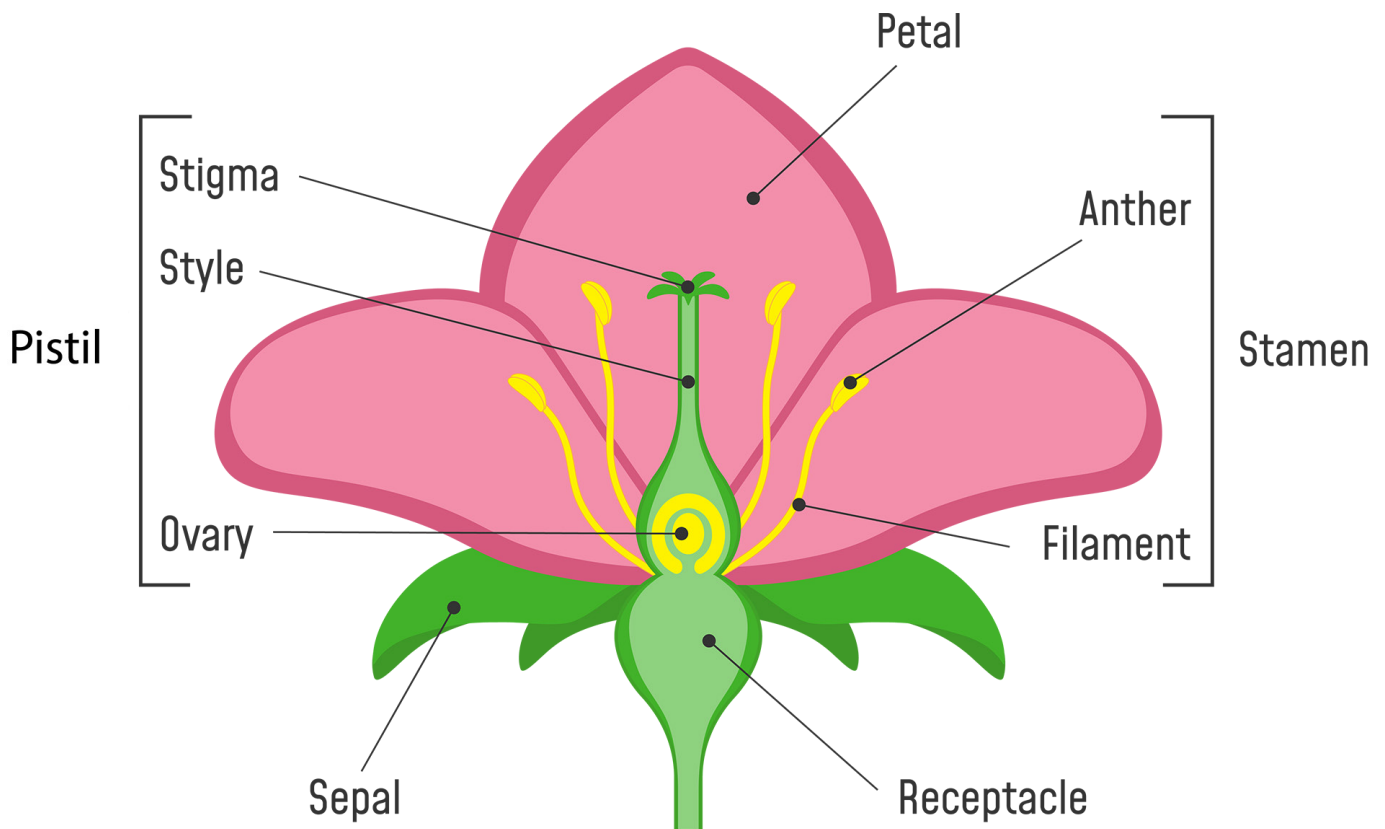
Meet with a local beekeeper

<https://www.localhoneyfinder.org/index.php#states>



Cover and interior page spread from: *The Book of Brilliant Bugs* by Jess French

Parts of a Flower

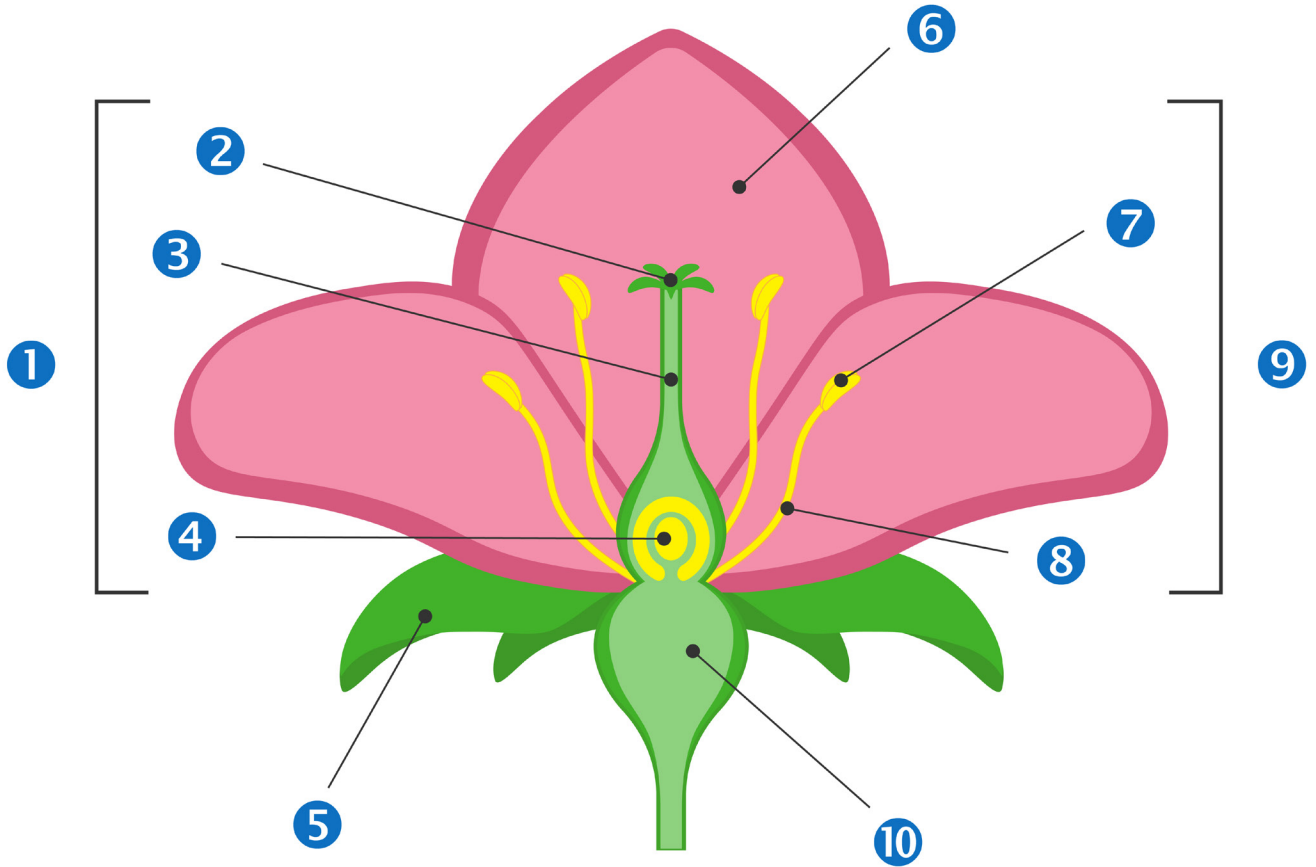


- **Anther:** the part of a flower that produces pollen grains.
- **Filament:** the long strand that supports the anthers.
- **Ovary:** the part at the bottom of the pistil where the eggs are produced. When the ovary is mature, it is a fruit like an apple.
- **Petal:** the outer parts of a flower that often have bright colors.
- **Pistil:** the part of the flower that makes ovules, or eggs. It has a long stalk, or style, under the stigma, and an ovary at the bottom. When the egg is mature, it is a seed.
- **Receptacle:** the part of a flower stalk where the pieces of the flower are attached.
- **Sepal:** the outer parts of a flower that cover a bud.
- **Stamen:** the part of the flower that makes and holds the pollen.
- **Stigma:** the sticky top of the pistil, where pollen grains end up.
- **Style:** the long stalk under the stigma.

Label the Parts of a Flower

Anther • Filament • Ovary • Petal • Pistil • Receptacle

Sepal • Stamen • Stigma • Style



1. _____

6. _____

2. _____

7. _____

3. _____

8. _____

4. _____

9. _____

5. _____

10. _____

Flower Dissection Sheet

Draw your flower		Pistil Stigma	Petals
Anther	Stamen	Style	Sepals
Filament		Ovary	



4

I spy pollinators!

Get kids outside to look for pollinators, plants that can be pollinated, and evidence of pollination — like fruit. Have them search for both insects, birds, or other animals that pollinate and flowers or other plants that need help to be pollinated or have already been pollinated and have fruit, veggies, or nuts growing. If kids find flowers, have them take time to look at the different parts of the flower and draw them in their Bug Journal.

I smell decomposition!

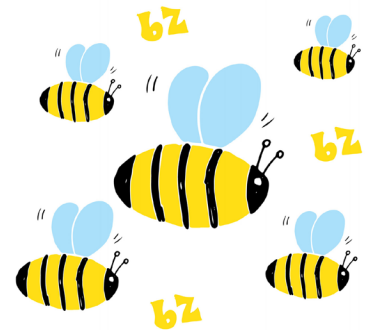
Encourage kids to use another sense and sniff out decomposition in progress. As a decomposition detective, what evidence of decomposing can kids find on the Bug Out adventure? Where do they notice decomposition at home? Have them make a list or draw what they see and smell decomposing in their Bug Journals.

What else do they smell? Air pollution can hurt pollinators' ability to find plants. Do they see, hear, or smell any sources?

Bug journal

Musical bugs?

Have kids write about what they learned through their senses as they explored pollination and decomposition outdoors, particularly what they heard. Could they hear insects at work? Ask them to note the chirps, clicks, zips, rattles, buzzes, and trills they heard. Was it music to their ears?



Insects have inspired music for centuries. Have kids brainstorm and research songs featuring bugs, like The Itsy Bitsy Spider, The Ants Go Marching, or La Cucaracha. Have kids write song lyrics to recognize the hard working insect pollinators and decomposers.



Bee a bug buddy

Have kids brainstorm a place where they could plant an insect garden. It could be in an already existing garden, in a park, at school, or community center. While they'll need permission to plant a garden in public places, they could also make an insect garden in pots or window boxes. Ideal places get at least six good hours of sun per day.

To determine what to grow, have kids research pollinators in your area and the plants they like, looking for plants that are native to the region. Insects can see different colors than people, so kids should design their pollinator garden with insect color preferences in mind. This guide with information about the best flower colors to attract pollinators can help: https://extension.illinois.edu/sites/default/files/what_are_the_best_flower_colors_to_attract_pollinators-1.pdf

Kids can help map out the garden, gather supplies, and start planting! Here's a guide to help you help them plan a pollinator garden: <https://kidsgardening.org/resources/lesson-plans-planning-a-pollinator-garden/>. Plans in hand, have kids build their garden and watch pollinators at work.

The picture book *Camilla, Super Helper* by Julie Dillemath also has a guide at the end.





Kid-Friendly Digital Media

Apps

PollNation ID App | University of Michigan

<https://umdearborn.edu/environmental-interpretive-center/community-engagement/pollination-project/pollination-id-app>

Online games

Pollinator Games | Purdue University

https://extension.entm.purdue.edu/POL_Virt_Learn/virtual-learning/

Be a Pollinator Aid-er | PBS

<https://pbskids.org/naturecat/games/pollinator-pathway>

Food Scrap Recycling Truck

<https://northamerica.novamont.com/foodscraptruck.php>

Websites

Pollination | BrainPOP

<https://www.brainpop.com/science/ecologyandbehavior/pollination/>

Pollinator.org

<https://www.pollinator.org/pollinators>

Composting

<https://kidsgardening.org/resources/gardening-basics-composting/>



Videos

Incredible Insects | National Geographic

<https://kids.nationalgeographic.com/videos/topic/incredible-insects>

Who Needs Dirt? | Crash Course

<https://www.youtube.com/watch?v=eCSlrlk0GTs>

The Dirt on Decomposers | Crash Course

<https://youtu.be/uB61rfeeAsM>

Worm Bin Decomposition Time-lapse

<https://www.youtube.com/watch?v=McQYDcqc0Nk>

Fruit and Vegetable Decomposition Time-lapse (look for the flies!)

https://www.youtube.com/watch?v=c0En-_BVbGc

Like Fruit? Thank a Bee! | SciShow Kids

<https://www.youtube.com/watch?v=txv2k7OoY7U>

Perfect and Imperfect Flower Dissection

<https://www.iowaagliteracy.org/Article/Perfect-and-Imperfect-Flower-Dissections>

Flower Dissection

<https://youtu.be/Eue0BV6VHvc>