

Day 5

Bugs and People





Introduction

This day focuses on bugs and people. People and bugs live together and impact each others' lives. Throughout history, bugs have played important roles. On the bad side, they have spread diseases, like [yellow fever](#), [sleeping sickness](#), or the [plague](#), and destroyed crops, causing [famines](#) and [poverty](#). On the good side, though, insects help people by [pollinating](#) plants, providing important links in [food chains](#), and improving soil to help plants grow.

Insects have also provided people with silk, honey, wax, and many other useful things. Insects have been used in medicine, too! And insects inspire us. People look to insects to solve problems and make life more beautiful. [Biomimicry](#) is innovation inspired by nature. People observe insects and their special abilities and use what they learn to invent things.

Questions to guide explorations and experiments

- How do insects impact our lives?
- How do we impact insects' lives?
- How can insects be harmful to people?
- How can insects be helpful to people?
- What insect abilities could we imitate to solve problems?
- What would happen if we didn't have insects in our ecosystems?

Books and activities

- **Books:** all about bugs and people, history, and biomimicry
- **Activities:** learn about biomimicry and helpful bugs



Children's Books

Fiction

- *The Ant and the Grasshopper* by Rebecca Emberley (ages 3-8)
- *Bug Sandwich* by Brady Smith (ages 3-7)
- *Bug Scouts: Out in the Wild!* by Mike Lowery (ages 6-8)
- *Chocolate Chirp Cookies* by Jenny Goebel (ages 4-8)
- *The King of Bees* by Lester L. Laminack (ages 4-8)
- *María Mariposa* by Karla Arenas Valenti (ages 3-7)
- *Masterpiece* by Elise Broach (ages 8-12)
- *10 Little Insects* by Davide Cali (ages 9-12)
- *A Way With Wild Things* by Larissa Theule (ages 3-6)
- *Why Mosquitoes Buzz In People's Ears* by Verna Aardema (ages 4-8)

Poetry

- *Behold Our Magical Garden: Poems Fresh From a School Garden* by Allan Wolf (ages 8-12)
- *Copycat: Nature-Inspired Design Around the World* by Christy Hale (ages 6-9)
- *Crawly School for Bugs: Poems to Drive You Buggy* by David L. Harrison (ages 5-9)
- *Natsumi's Song of Summer* by Robert Paul Weston (ages 3-7)

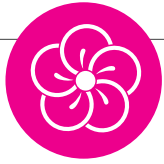
Nonfiction

- *Beastly Bionics: Rad Robots, Brilliant Biomimicry, and Incredible Inventions Inspired by Nature* by Jennifer Swanson (ages 8-12)
- *The Bees of Notre-Dame* by Meghan P. Browne (ages 4-8)
- *Biomimicry* by Dora Lee (ages 8-12)
- *Bugged: How Insects Changed History* by Sarah Albee (ages 8-12)
- *Bugs: A Skittery, Jittery History* by Miriam Forster (ages 8-12)
- *Bugs Everywhere* by Lily Murray (ages 6-9)



Children's Books

- *Bugs for Breakfast: How Eating Insects Could Help Save the Planet* by Mary Boone (ages 8-12)
- *The Butterfly Alphabet* by Jerry Pallotta (ages 4-8)
- *The Butterfly Alphabet* by Kjell Bloch Sandved (ages 5-10)
- *Buzzkill: A Wild Wander Through the Weird and Threatened World of Bugs* by Brenna Maloney (ages 10 and up)
- *Invented by Animals: Meet the Creatures Who Inspired Our Everyday Technology* by Christiane Dorion (ages 7-10)
- *Let's Eat BUGS!* by Judy Goldman (ages 8-12)
- *Mimic Makers: Biomimicry Inventors Inspired by Nature* by Kristen Nordstrom (ages 7-11)
- *Nature Did It First: Engineering Through Biomimicry* by Karen Ansberry (ages 6-10)
- *Please Don't Bite Me: Insects That Buzz, Bite, and Sting* by Nazzy Pakpour (ages 7-10)
- *The Secret Life of Bugs* by Moira Butterfield (ages 7-11)
- *What's Your Favorite Bug?* by Eric Carle (ages 4-8)
- *What on Earth? Explorer: Bugs!* by Nick Forshaw (ages 7-11)
- *The Wonderful Wisdom of Ants* by Philip Bunting (ages 4-8)



Activity 1: Innovate with Insects

5

Introduction

Biomimicry is innovation inspired by the systems, behaviors, and other features and effects observed in nature. It is all about observing what works in nature and mimicking it in order to create a solution to a problem or to innovate. Kids can explore their own interests and make deeper connections with the world around them as they use bugs and lessons from nature as inspiration to design solutions to problems.

Supplies

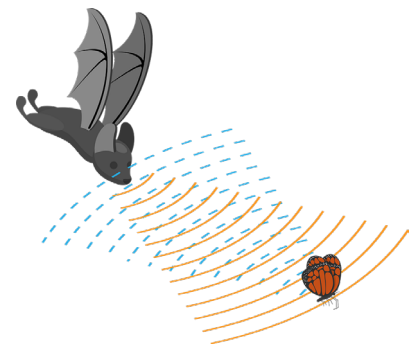
- Pencil and paper (or Bug Journal)
- Biomimicry examples (pages 91–93)
- Access to the Internet
- Materials for building prototypes (optional)

Get kids thinking ...

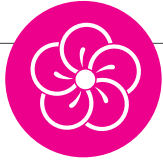
Ask: Can you give any examples of problems bugs or insects have had and have solved for themselves, such as what are some physical characteristics of insects that help protect them or any special body parts that help them survive? How can we use our understanding of bugs and insects to help solve a problem at home or in our community?

Let's get started!

Start with a book! Inventions and innovations inspired by insects are featured in these titles you can share with kids: *Invented by Animals: Meet the Creatures Who Inspired Our Everyday Technology* by Christiane Dorion, *Nature Did It First: Engineering Through Biomimicry* by Karen Ansberry and *Beastly Bionics: Rad Robots, Brilliant Biomimicry, and Incredible Inventions Inspired by Nature* by Jennifer Swanson.



Bat sonar (echolocation)



Activity 1: Innovate with Insects

5

Talk about how people can use the characteristics and behaviors of plants and animals to develop solutions to many human-related problems, like how the spiny seeds, or burrs, that stuck to George de Mestral's pants and his dog's fur resulted in his close examination of microscopic hooks on the burr and the invention of Velcro®. Explain how biomimicry works and how scientists, engineers, and others — even kids! — look to nature and use it to help solve problems they see.

Step 1

Have kids review the biomimicry inventions you read about together, share the examples on pages 84–86, and research some additional examples. Ask kids to think about the ways bugs have helped humans solve a problem. As a group, put together a list of bug or insect characteristics or behaviors and the problems they helped solve.

Step 2

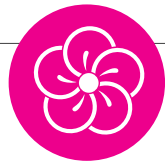
Get kids to identify a specific problem to focus on. As a group, brainstorm problems kids and their families face on a daily basis and generate a list to discuss further. These could be everyday problems at home, such as too much congestion in the bathroom in the mornings, disorganized storage or toy spaces, or needing to keep breakables safe from siblings, or issues in your community, such as areas that flood, heat islands, or keeping bodies of water clean. Have kids work in pairs or small groups to decide on the problem they want to solve and write it down.

Step 3

Next, kids should put their imaginations to use and start brainstorming solutions with their partner or small group. Because biomimicry relies on close observation, kids should have opportunities to head outside and observe or review videos of insects of interest. As they consider ideas and research insects for inspiration, remind them that they will need to come up with a design or prototype, so they need to think their solutions through carefully.

Step 4

Have kids write and/or draw what their solution looks like. Have them note what bugs and/or insects or other animals inspired them, list what materials they will use for their solution, or explain any processes they want to implement that mimic insect social behaviors.



Activity 1: Innovate with Insects

Step 5

If materials are available, have kids build their prototype and test it to see how it works or what refinements it might need. Pairs or groups should share their plans and/or prototypes with everyone, get feedback, and further refine as desired.

More activities about insect biomimicry

Design a helmet inspired by ladybugs

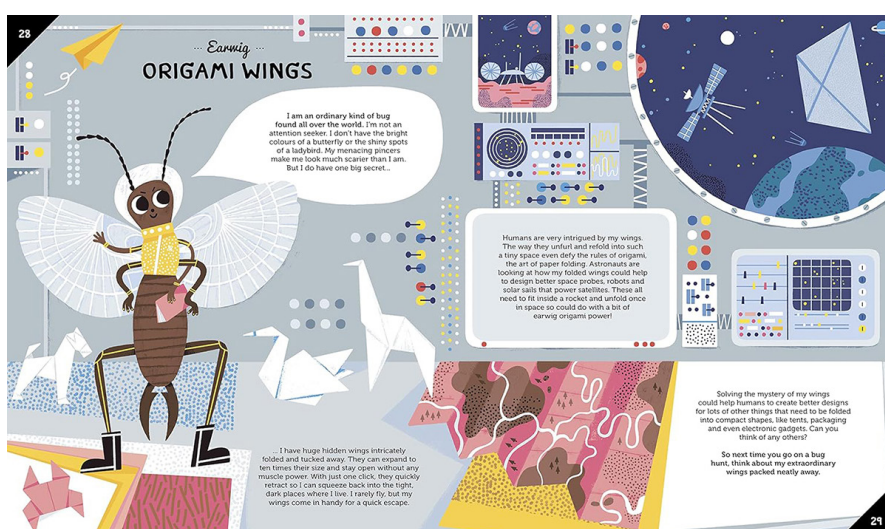
<https://thinkdivebiomimicry.org/2017/09/01/design-a-helmet-inspired-by-ladybirds/>

Design a tabletop supply organizer inspired by the natural home of an insect species

<https://www.teachengineering.org/activities/view/uof-2359-naturally-organized-insect-design>

Make beeswax wraps

<https://www.wildlifewatch.org.uk/sites/default/files/2022-01/BEESWAX-WRAP-RGB.jpg>



Cover and interior page spread from: *Invented by Animals: Meet the Creatures Who Inspired Our Everyday Technology* by Christiane Dorion

Biomimicry Examples



Velcro® was invented by Swiss engineer George de Mestral in 1941 when he studied how **burr seeds** stuck to the fur of his dog. Close examination revealed the microscopic hooks on the seeds.



Shark skin is made up of lots of tiny overlapping scales with small grooves that help water flow over the shark's body, reducing drag and allowing it to swim faster. Shark skin has inspired materials for faster swimsuits and special coatings for submarines and ships.

Biomimicry Examples



Have you ever seen a gecko climb a wall or “stick” to a ceiling? **Gecko feet** are covered in thousands of tiny hairs that can grip onto different surfaces; to release their grip, geckos just peel their toes away. Humans have studied these tiny hairs to invent a super strong tape that can be peeled off and used over and over again.



Wasps are master paper makers, chewing bits of wood into a soft pulp to build their annual nests. When the pulp hardens it creates a waterproof home for the queen wasp to lay her eggs. In 105 A.D., a Chinese man created paper from wood after observing the wasp’s technique. We still use wood today, but big efforts have been made to recycle paper rather than cut down more trees.

Biomimicry Examples



Termite dens are the perfect home for their insect inhabitants, staying at about 87 degrees inside as the outside temperature shifts from freezing to sweltering. The architect of Eastgate Centre in Harare, Zimbabwe, studied how the chimneys and tunnels of termite dens draw in cool air at night. He applied those lessons to the building, which uses 90% less energy to heat and cool than traditional buildings.



Whales are efficient swimmers! Scientists discovered that bumps at the front edge of a **whale fin** help by reducing drag and increasing lift. Now we are using that knowledge to design more efficient wind turbine blades, cooling fans, airplane wings, and propellers.



Activity 2: Helpful Bugs

Introduction

A lot of people don't like bugs. They find them scary or annoying. But many bugs are helpful, and we'd be in trouble without them. Throughout history, and even now, insects help people. Some bugs eat other bugs that are harmful to people or their crops. Bugs are also a source of food for other animals, they pollinate plants, and enrich the soil. And without some special bugs, we wouldn't have silk, honey, or wax!



Bugs have played important roles in history. The demand for silk inspired an important trade route in the Middle Ages, the Silk Road, that connected China to Eastern Europe. Traders traveled to buy and sell silk, spices and other items. In ancient cultures, honey was used as a food, a preservative, and a medicine. Wax has been used to make candles, to waterproof things, and in cosmetics. Today, bugs continue to help us in many ways. Kids can learn more about helpful bugs and then create something — a poster, video, slide show, song, game, skit, or signs — to educate others and raise awareness about how bugs benefit us all.

Supplies

- Books about bugs in their ecosystems
- Paper
- Markers or colored pencils
- Materials to make their chosen project such as posters, games, or props for a skit
- Computer and printer (optional)
- Internet access to kid-friendly nature sites (optional; see page 100 for suggestions)
- Tools to make a video or digital slideshow (optional)



Activity 2: Helpful Bugs

Get kids thinking ...

Ask: Why do some people not like insects? What are some problems bugs create for people? What are some helpful bugs you can think of? What could you do to teach people about helpful bugs? Get kids to brainstorm about what they can do to educate others about helpful bugs.

Let's get started!

Start with a book! Try *Give Bees a Chance* by Bethany Barton or the poems "Good Bud, Bad Bug" or "We Treat Your Food Like It's Our Own" from *Behold Our Magical Garden: Poems Fresh From a School Garden* by Allan Wolf. Discuss how people perceive bugs and how knowing more about bugs might help them change their ideas.

Step 1

Have kids brainstorm and then research bugs in the categories below. Encourage them to write down what they learn.

Bugs that eat other bugs.

Aphids and other bugs eat farmers' crops. Some insects like ladybugs and lacewings eat aphids. Dragonflies and damselflies eat bugs that pose direct challenges to people, like mosquitoes.



Bugs that feed other animals.

Birds, reptiles, amphibians, fish, and some mammals — even people — eat bugs. They are an important source of food for many.

Bugs that pollinate plants.

Many plants that produce fruits and vegetables need to be pollinated. Some other kinds of animals help pollinate plants, but insects do the most. Without insects, we wouldn't have many of our favorite foods like berries, apples, vanilla, potatoes, and chocolate.

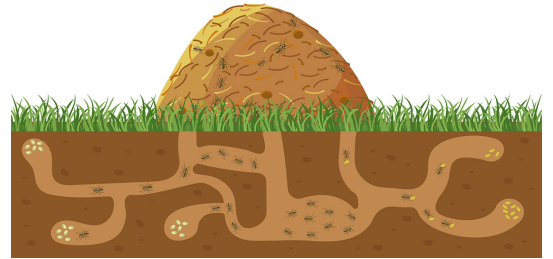




Activity 2: Helpful Bugs

Bugs that help the soil.

Some bugs enrich the soil by eating dead plants and animals. Their poop provides nutrients to the soil. Others dig underground, breaking up and helping air get to the soil. Healthy soil is needed to grow plants, the first producer of food in every food chain.



Bugs that are useful to humans.

Besides pollinating, bees make wax and honey. Some other insects make wax, too! Silk worm cocoons are made into silk, a strong and light fabric. Some insects are used in medicine, such as maggots (fly larvae) in wound care or bee venom to treat infections and other diseases.

Step 2

Have kids decide what they want to do to teach others about helpful bugs. They could all work on the same project, work in groups, or each do their own thing. They could teach about every category of helpful bug, or each group could choose one category to focus on.

Some kids may want to research how to manage bugs that spread disease without using [pesticides](#) that could hurt helpful bugs. For example, you can reduce mosquito bites by using mosquito netting, fostering bat populations, and eliminating standing water where mosquito babies grow.



Step 3

Support kids as they create their helpful bug projects. Remind them to think about their target audience (younger kids, family members, folks in the community), and what might appeal to them. Give kids enough time to make a rough draft and a final product or to practice and revise songs or skits.

Step 4

Share the knowledge and bug love! Have the kids share their projects with each other and then with others. Help them find audiences for their projects.



Activity 2: Helpful Bugs

More activities about helpful bugs

Beneficial Bugs Scavenger Hunt

<https://www.uky.edu/Ag/Entomology/ythfacts/resourc/tcherln/bughunt.htm>

Ancient Egyptian Scarab Handmade Pin Craft

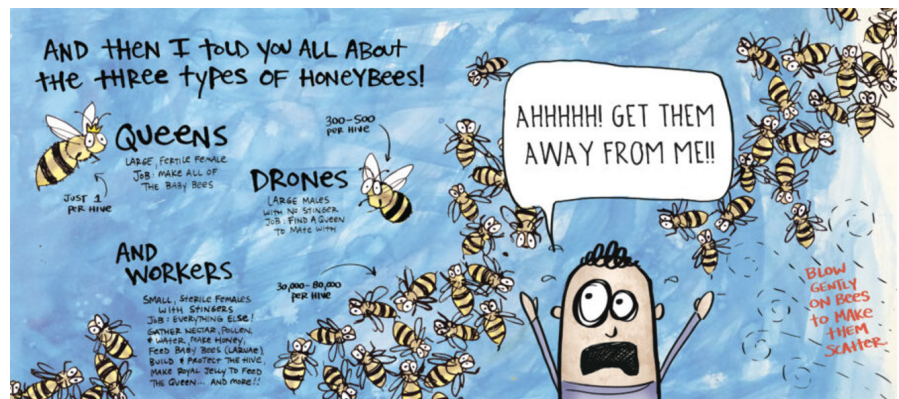
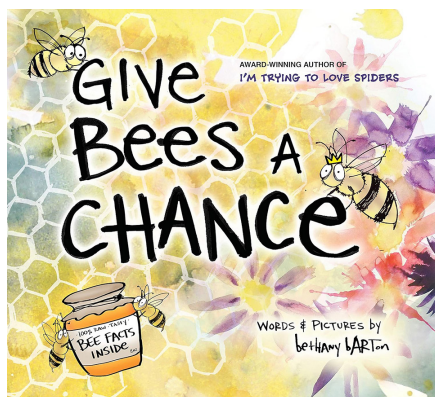
<https://kidsactivitiesblog.com/237450/ancient-egyptian-scarab-handmade-pin-craft/>

Insect Clothespin Craft

<https://www.littlepassports.com/blog/craft-diy/insect-craft-for-kids/>

Dragonfly Paper Craft

<https://iheartcraftythings.com/dragonfly-craft-template.html>



Cover and interior page spread from: *Give Bees a Chance* by Bethany Barton



5

Communities and communication

Before you Bug Out, get kids thinking about similarities between insects and people. Talk about looking outside for evidence of how, like humans, insects relate to each other. They might listen for the songs of insects looking for mates or watch for insects communicating through “dance.” Or they may find ants working together to find and bring food to their nest or observe bugs fighting for territory.

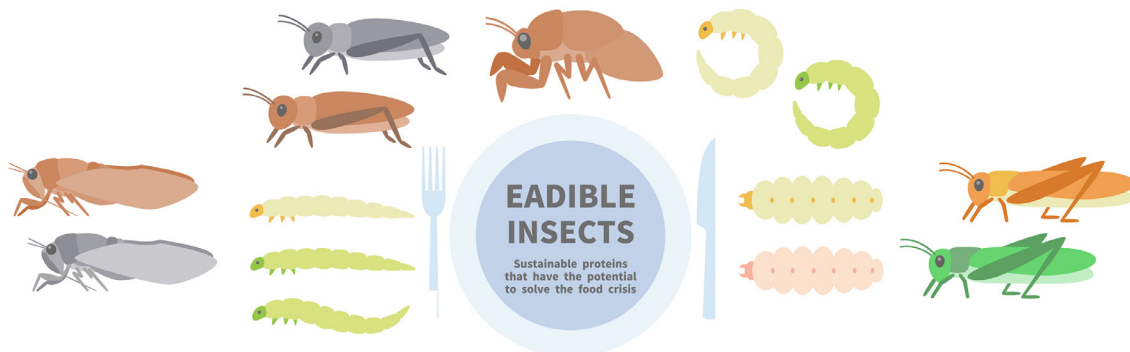
If kids have access to phones or other recording devices, encourage them to make videos of the behaviors they observe and be prepared to explain what is happening when they show their videos to everyone.

Bug journal

Bugs on the menu!

Food and eating are always a big part of everyone’s daily life — people and insects alike! Bugs are a source of food for lots of organisms, even people! Have them explore how they feel about eating bugs by asking them to create a menu description for a bug-filled dish! They might imagine grasshopper tacos, ice cream with ladybug sprinkles, or pizza with insect toppings!

And while kids may not be enthusiastic about making and eating a dish with insect ingredients (like these: <https://bugvivant.com/edible-insect-recipes/>), if time and supplies permit, you can all work together to make and enjoy a dish named for insects like ants on a log, grasshopper pie, or one of these recipes: <https://www.familythemedays.com/bugs---foods.html>.





It's a bug's life

Have kids examine the different roles insects play: Insects are parents, siblings, workers, hunters, gatherers, community members, and innovators! Ask them to compare the day-to-day lives of insects to their own and write about it.

Bee a bug buddy

Invite kids to reflect on all the things they've learned about insects and how important they are to our ecosystems. Expand on the Helping Bugs activity to put on a community Bug Festival that raises awareness and increases insect appreciation in your neighborhood, school, or town about the importance of insects and their needs.

Ask kids to make a list of things they've learned about insects that they want to share. Then have them work in groups to brainstorm ways to share important insect information in a fun and engaging way. What are the best ways to show or tell others how to care for insects and provide information about helpful bugs? Here are some ideas:

- Guide a hands-on-activity, create a game, do a skit, or perform a waggle dance
- Demonstrate how to compost or create bug-friendly habitats and insect gardens
- Have an insect costume contest, insect face painting, and offer bug snacks
- Research and invite local master gardeners or farmers, beekeepers, entomologists, and naturalists to share their expertise

Help kids find a time and place to hold your event and get necessary permissions. Support them as they plan different activities, invite special guests, and make posters and videos to advertise the event. Assist them in spreading the word about the event to community, church, and school groups. By sharing knowledge and positive attitudes about insects, kids can help their community and the whole planet!



Kid-Friendly Digital Media

Apps

Seek

https://www.inaturalist.org/pages/seek_app

Online games

Bug Memory Game | National Geographic

<https://scied.ucar.edu/activity/greenhouse-gas-game>

Websites

How insects help keep ecosystems in balance | World Wildlife Fund

<https://www.worldwildlife.org/magazine/issues/spring-2023/articles/here-s-how-insects-help-keep-ecosystems-in-balance>

Beeswax Through History

<https://bzzwax.com/blogs/all-beeswax/beeswax-through-history-from-prehistory-to-current-days>

Ask Nature

<https://asknature.org/>

Videos

Biomimicry

<https://youtu.be/4a8nGf9AXX0>

Biomimicry: Design by Nature

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

Helpful Insects | Children's Hands-on Museum of Tuscaloosa

<https://www.youtube.com/watch?v=G23U1kWHb8k>

See How Termites Inspired a Building That Can Cool Itself

<https://www.youtube.com/watch?v=620omdSZzBs>