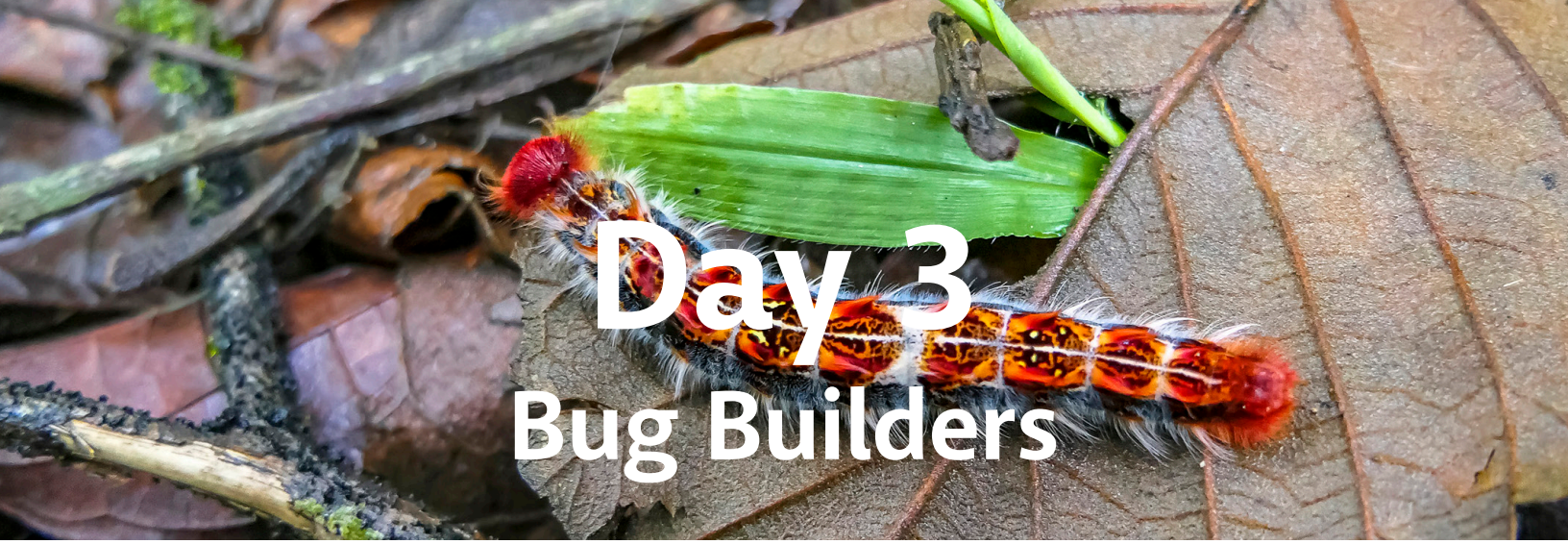
Day 3
Bug Builders



Day 3
Bug Builders

Introduction

Bugs live everywhere! You can find insects all around us and in all kinds of **habitats**, from rainforests, to hot deserts, to grasslands, to streams and ponds, to canyons and mountains. Since we share habitats with insects, this day focuses on helping kids understand what insects need to survive and thrive in those habitats. Kids will learn about insect habitats, create a habitat for insects, and invent their own insect with adaptations for a specific habitat.

Questions to guide explorations and experiments

- Where do bugs and insects live?
- What do insects need to survive?
- Who and what else shares spaces with insects?
- How are insect habitats different or similar to those of other animals?
- Why do different habitats have different numbers and types of insects?
- How are characteristics of insects related to their habitats?

Books and activities

- **Books:** all about where bugs live and their habitat needs
- **Activities:** learn about and create insect habitats; invent a new insect

Children's Books

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Fiction

- *Bug City* by Dahlov Ipcar (ages 4-8)
- *Bug Patrol* by Denise Dowling Mortensen (ages 4-8)
- *Busy Bug Builds a Fort* by David A. Carter (ages 4-8)
- *Camilla, Super Helper* by Judy Dillemuth, PhD (ages 4-8)
- *Dirt and Bugsy: Bug Catchers* by Megan Litwin (ages 5-7)
- *Du Iz Tak?* by Carson Ellis (ages 4-8)
- *Firefly Home* by Jane Clarke (ages 3-6)
- *The Girl Who Loves Bugs* by Lily Murray (ages 4-8)
- *Inch and Roly and the Very Small Hiding Place* by Melissa Wiley (ages 4-6)
- *James and the Giant Peach* by Roald Dahl (ages 8-12)
- *Roberto the Insect Architect* by Nina Laden (ages 4-8)
- *Violet Mackerel's Natural Habitat* by Anna Branford (ages 6-9)
- *Where Once There Was a Wood* by Denise Fleming (ages 4-8)

Poetry

- *A Strange Place to Call Home: The World's Most Dangerous Habitats and the Animals That Call Them Home* by Marilyn Singer (ages 5-8)

Nonfiction

- *Bonkers About Beetles* by Owen Davey (ages 7-10)
- *Bug Builders* by Timothy Bradley (ages 8-10)
- *Busy Builders* by Roxie Munro (ages 5-10)
- *Extraordinary Insects* by Matt Turner (ages 8-12)
- *Hello, World! Exploring Insects* by Jill McDonald (ages 4-8)
- *How To Build an Insect* by Roberta Gibson (ages 5-9)

Children's Books

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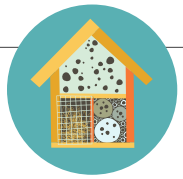
- *Hustle Bustle Bugs* by Catherine Bailey (ages 4-8)
- *Insects: The Most Fun Bug Book Ever* by Sneed B. Collard III (ages 9-12)
- *Insect Superpowers: 18 Real Bugs That Smash, Zap, Hypnotize, Sting, and Devour!* by Kate Messner (ages 8-12)
- *Small Wonders: Jean-Henri Fabre and His World of Insects* by Matthew Clark Smith (ages 6-9)
- *We Build Our Homes: Small Stories of Incredible Animal Architects* by Laura Knowles (ages 4-8)
- *Where Do Insects Live?* by Molly Aloian (ages 4-8)
- *Wow! Look What Bugs Can Do!* by Camilla de la Bedoyere (ages 6-9)



Activity 1: Bug Habitats

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Introduction

There are so many bugs that share the planet with us and other animals and plants. Like all living things, bugs need a place to call home! Many insects are able to live in many different **habitats**, including grasslands, deserts, forests, cities, suburbs, and along rivers. Some live aboveground, some underground, and some underwater. Others need plants and trees to make a home while others will build their own. Kids can explore the habitats of insects in their community and help those that need habitat support by building a bug hotel.

Supplies

- Bamboo, sticks, seed heads, dried leaves, bark, wood shavings, straw, hay, moss, and other natural materials collected off the ground (If kids help collect natural materials, avoid existing piles of leaves and sticks in case those are already being used for insect shelter.)
- Newspaper, cardboard, cardboard tubes, sturdy shoe box or other small cardboard box, or a small wooden box
- Empty, clean 1 or 2 liter plastic bottles cut in half or other plastic containers (32 oz.) with drainage holes added or ceramic flower pots with drainage holes
- Scissors and twine

Activity 1: Bug Habitats

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Get kids thinking ...

A habitat provides food, water, shelter, and safe spaces where you can go. Have kids make some observations about their own habitat. **Ask:** Where do you get what you need to survive? Does what you need change with the seasons?

Let's get started!

Start with a book! Head outside for a read aloud of *Where Do Insects Live?* by Molly Aloian, *Busy Builders* by Roxie Munro, or *Du Iz Tak?* by Carson Ellis. After reading, talk about the things that make up habitats and have kids think about what insects need to survive. **Ask:** Where do insects get what they need? Do you see the things bugs need here, outside where we are, to make a home?

While you're outside, have kids observe insects and see if they can find their homes. As they follow all the rules for safe insect observation, kids can carefully turn over logs or stones, look in bushes and trees, check underneath leaves, or search for bug-built homes, such as anthills. Kids can use their Bug Journals to map where and how many insects they found, noting details about the bugs and their habitats.

Activity 1: Bug Habitats

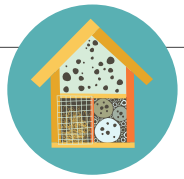
Have kids share what they found and where. Talk about how insect habitats are in use all year round and what this particular habitat should have to provide space for insects to reproduce and rear their young, offer protection from predators and cool resting places on hot days, provide food sources, and offer shelter from harsh weather. Ask kids to share their ideas for how this space could provide a habitat for insects in every season then explain how kids can help provide safe shelter for insects by building and maintaining a bug hotel.

Step 1

Remind kids about what they've observed about the homes of some bugs. Bugs aren't looking for much more than shelter and safety, so their bug hotels should be designed and built with bug appeal. Ask them to spend some time thinking like an insect about what it needs, as they sketch design ideas for their hotel. It is also important to think about location, location, location! Where will they put their bug hotel? Have them refer to their habitat map in their Bug Journal for ideas.

Step 2

Let kids explore the materials they have available for building. Talk about some basic design requirements: it needs to keep water out, air needs to be able to circulate, and it should be easy to clean — and design options: the hotel can be hung up, perched on a tree or fence, or secured on the ground.



Activity 1: Bug Habitats

Step 3

Model how to make your own bug hotel. Provide kids with some inspiration as they watch you follow these steps:

- **Think out loud:** *I love ladybugs! I learned that they like to burrow together in the gaps found in piles of twigs and small sticks.*
- **Draw** a bundle of sticks and **think out loud**: *If I layered these sticks inside something that would keep them dry, that could be a good hotel*. **Draw** a container around the bundle of sticks.
- **Choose your materials.** *I'm going to set aside the twigs and sticks I want to use and look at some different containers.*
- **Demonstrate** how to tightly pack twigs and sticks into a flowerpot or other container. Break any twigs and sticks hanging out of the container so that everything inside stays dry.
- **Think out loud** about where you will place your bug hotel outside so that it gets morning sunlight and won't be disturbed.

Step 4

Let kids start their designs and build their bug hotels. For kids building with specific bugs in mind, have books on hand for researching habitat and nesting preferences of their insects.

Step 5

Help kids place their bug hotels in appropriate dry locations outside. Have them add their bug hotels to their habitat maps in their Bug Journal.

Step 6

Encourage kids to check on their hotel guests! Plan for regular visits to the bug hotels for kids to observe visitors and make notes — and to keep an eye on its cleanliness, removing any materials that have become moldy or waterlogged.

Activity 1: Bug Habitats

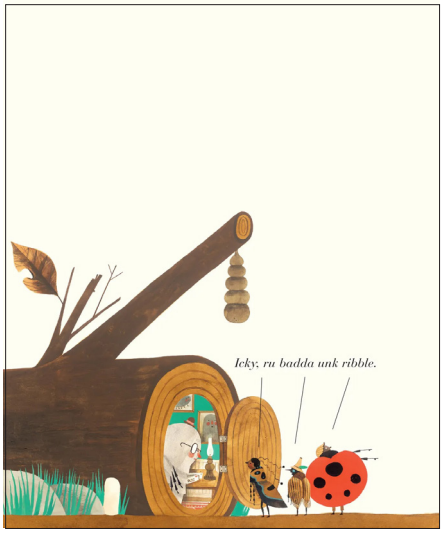
More activities to attract insects

Build a Ladybug Lodge

https://www.nhm.ac.uk/discover/how-to-make-insect-hotel-ladybird-lodge.html

DIY Butterfly Feeder

https://hudsonriverpark.org/app/uploads/2020/07/DIY-Butterfly-Feeder.pdf



Cover and interior pages from: *Du Iz Tak?* by Carson Ellis

Activity 2: Build a Bug

Introduction

Insects need food, water, shelter, and safe space to survive, but there is more to survival than just the right **habitat**. Insects have many **adaptations** that help them survive. Insect legs are adapted to work best in the insect's particular environment — dirt, sand, water, or trees. Insect mouths are adapted to what and how they eat. Wings are an adaptation that help insects get around for food, shelter, and reproduction — but they can also be a protective cover, provide camouflage, or attract a mate. Kids can explore and learn more about insect adaptations when they invent their own insect with unique adaptations for its environment.

Supplies

- Pencil and paper (or Bug Journals)
- Invented Insect Planning Sheet and Field Guide (pages 57–59)
- Drawing and coloring supplies
- Children's books and insect field guides

Get kids thinking ...

Ask kids and discuss: What else besides a habitat does an insect need to survive? How does an insect's body structures relate to its ability to survive? What happens when bugs cannot adapt to changes in their environment?

Let's get started!

Start with a book! Share *How to Build an Insect* by Roberta Gibson to remind kids about what they've learned about insect characteristics and features. Talk about how insects depend on their physical features and their behaviors to help them be successful in their habitats. Have kids look at other titles such as *Wow! Look What Bugs Can Do!* by Camilla de la Bedoyere and *Extraordinary Insects* by Matt Turner, as well as insect field guides, to find more insect adaptations to inspire their own invented insect.

Activity 2: Build a Bug

Step 1

Provide kids with the **Invented Insect Planning Sheet** (see the following two pages). Let kids know that they need to use both their imaginations and their bug knowledge to design a new insect that can survive in a habitat of their choice. Their insect must include all the parts of an insect and can also include optional parts or adaptations that will help it survive in its environment.

Step 2

After kids have completed their planning sheet, have them use those details to draft a field guide entry for their insect that includes its name, a detailed description of its appearance, habitat, range, behavior, food, predators, life cycle, and an interesting fact. Kids should also create a color sketch of what their insect looks like. You can use the Field Guide Template on page 59 or kids can develop their invented insect field guide entry in their Bug Journal.

Step 3

Have kids present their insects to each other and encourage questions.

“Invented Insect” Planning Sheet

Answer the questions below to help you create and describe your own insect:

Where does it live?

What is my insect’s habitat?

What does my insect eat? Where does it find food? How does it catch its prey?

What can eat my insect? How can my insect escape predators?

What does my insect look like (body shape, color, wings, mouth type)?

How does my insect move?

“Invented Insect” Planning Sheet

What is my insect’s life cycle?

_____

_____

How do its physical features make it well adapted for its habitat?

_____

_____

What adaptations does your insect have to give it an advantage in surviving inside its environment?

_____

_____

What are some things that make my bug special? What are the advantages to these special characteristics?

_____

_____

What is my insect’s name?

_____

“Invented Insect” Field Guide

_____

Draw your insect below:

Appearance: _____

Habitat: _____

Range: _____

Food: _____

Predators: _____

Life cycle: _____

Interesting fact about this insect: _____

_____

Activity 2: Build a Bug

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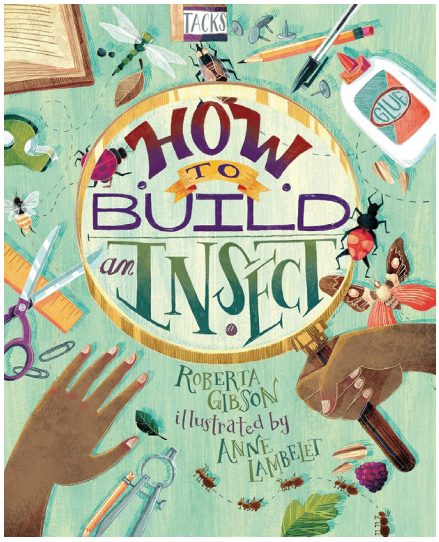
More activities about the unique characteristics of insects

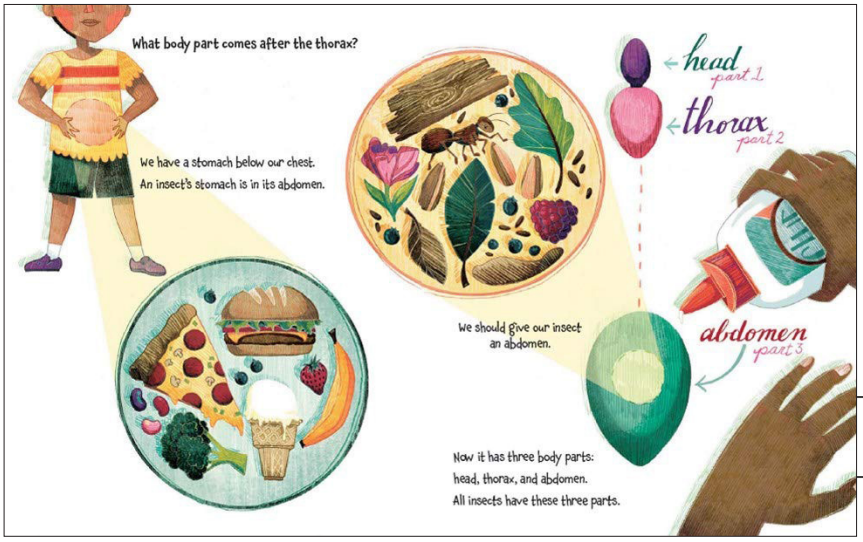
Design a robotic insect
https://www.jpl.nasa.gov/edu/learn/project/design-a-robotic-insect/

Investigate how different insects eat by experimenting with tools that are similar to insects' mouths
https://www.pnc.com/en/about-pnc/corporate-responsibility/grow-up-great/lesson-center/curious-crawlers/how-do-insects-eat.html

Learn about the relationship of insect mouth structures to what the insects eat with Mouthparts Mayhem
https://www.entsoc.org/sites/default/files/files/education-outreach/Lessons_ABCs.pdf

Walk like a bug
https://fyi.extension.wisc.edu/wi4hpublications/files/2015/10/TheBugWalk026.pdf





Cover and interior spread from: *How to Build an Insect* by Roberta Gibson

Bug Out!

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On this Bug Out adventure, have kids pay particular attention to insect habitats

Get them to carefully search for places insects could eat, rest, shelter, or hide. Encourage them to get down on the ground and look for crawling insects but also look up high for those that might be flying by. Have them inspect leaves and gently turn them over to see what may be hiding underneath. Urge them to patiently watch and wait for insects to visit flowers or water sources. If they turn over any rocks or logs to find insects, remind them to be sure to put things back the way they found them.

Bug journal

Mapmaking

As part of your time outdoors, have kids map the space you're in and spend time observing what is there. Get them to take notes on what they see, noting all the different trees, flowering plants, shrubs, grass, etc., as well as water and food sources and access to safe spaces. After an initial survey, kids can draw and label a map of the space and use it to track how the space is being put to use as habitats for insects or to advocate for improving the space for bugs and other wildlife.

Real estate ads ... for bugs!

As kids discover insect habitats, get them to imagine how they can help bugs find the best places to stay. Having observed habitats or having made a bug hotel, ask kids to get creative and write an advertisement for bugs that promotes the very best in habitats! Kids can research a real place or use their imaginations to conceive the ideal location. But they should make sure bugs who read this ad can find out all the details about the food, water, shelter, and safe spaces that are available to them.

3

Bee a bug buddy

As kids walk around outside, have them think about what their surroundings would look to them if they were an insect.

- What is there to eat?
- Where can they stay safe from predators?
- How easy is it for them to fly or get around?

Write a persuasive letter

Have kids work in small groups to map the area, noting all the things that are there that are good for bugs and all the things that are missing or could be changed that could help them. Have them share their maps and then together come up with one list of things that would be important to do to help improve the area as insect habitat. Share their list, along with a letter they compose that advocates for change, with the managers of the location and/or local government.

Kid-Friendly Digital Media

3

Apps

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

Online games

Insect Generator
https://mrnussbaum.com/insect-generator-online-game

Make a Habitat Mapping Game
https://www.pbs.org/parents/crafts-and-experiments/make-a-habitat-mapping-game

Websites

Microsculpture, the Insect Portraits of Levis Biss
http://microsculpture.net/

Funny Names for Pest and Insects
https://www.pointepestcontrol.net/funny-names-for-pests-and-insects/

Videos

Arthropod Adaptations | Smithsonian Education
https://www.youtube.com/watch?v=bz4ODmqbnQA

How Insects Hide in Plain Sight
https://www.pbslearningmedia.org/resource/how-insects-hide-plain-sight-animation/whats-bugging-you/

Insect Habitats | Nature WY
https://www.pbslearningmedia.org/resource/insect-habitats-video/nature-wy/

Living Things Change: Crash Course Kids
https://www.youtube.com/watch?v=xDSFlRunlrU

The World Under a Rock!
https://www.youtube.com/watch?v=fxYp76jWxSU