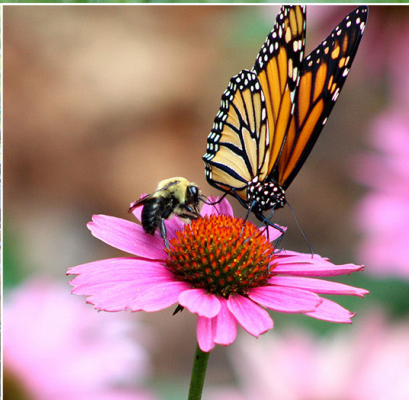


# Bug Buddies

A 5-day science adventure for kids

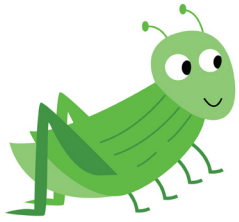


Explore, read, invent, build, and learn —  
all about bugs and pollinators



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with support from the Park Foundation





# Bug Buddies

*A book-based adventure about insects*

<b>Welcome to Bug Buddies</b>	<b>1</b>
How to Use This Toolkit, Daily Bug Out, and Bug Journals	
<b>Day 1: What Are Bugs?</b>	<b>11</b>
(1) "Bugs" vs Insects; (2) Exoskeleton Challenge	
<b>Day 2: Bug Life</b>	<b>26</b>
(1) Bug Babies: Explore an Insect's Life Cycle; (2) What's Eating You? Insects in the Food Chain	
<b>Day 3: Bug Builders</b>	<b>47</b>
(1) Bug Habitats; (2) Build a Bug	
<b>Day 4: Bugs in Our Lives</b>	<b>64</b>
(1) Decomposition: Get Down to Earth; (2) Pollination: Be a Bee	
<b>Day 5: Bugs and People</b>	<b>85</b>
(1) Innovate with Insects; (2) Helpful Insects	
<b>APPENDIX</b>	
<b>Bug words</b>	<b>95</b>
<b>Printable templates</b>	<b>101</b>
(Name tags, bug journal cover, certificate)	

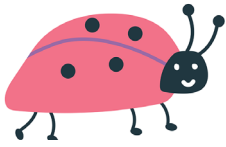


## Introduction

Bugs may be small, but there are more insects on Earth than any other kind of animal. According to the Smithsonian's Museum of Natural History, "at any time, it is estimated that there are some 10 quintillion (10,000,000,000,000,000,000) individual insects alive ... Recent figures indicate that there are more than 200 million insects for each human on the planet!"

Insects play an important role in ecosystems and our lives, even if we don't always see them doing their jobs. They help plants grow and help dead plants and animals break down and build healthy soil. They are an important part of the food chain, providing food for some creatures and eating others. A world without insects would mean most bird and amphibian species would be extinct. There'd be no coffee, honey, or chocolate and products like waxes, lotions, cosmetics, dyes, polishes, varnishes, and inks. Scientific and medical research would be stalled. Understanding and valuing what insects contribute and make possible is crucial for maintaining our ecological health.

Some people find insects beautiful and interesting. Others might find some bugs scary. Many people of all ages are afraid of bees, wasps, or other insects that sting and bite. Some fear any kind of creepy crawl. The truth is, unless you are allergic to stings or get bitten by a bug carrying an illness, there's little to be afraid of. The more you know about insects and their fascinating lives, the more there is to appreciate. Bug Buddies provides opportunities for kids to learn about bugs and their function in nature which can help reduce any anxieties about insects and get them exploring the natural world in new ways. Bug Buddies also gets kids outside, prompts them to observe and write, and encourages them to explore and test ideas.



# Welcome to Bug Buddies

The best way to get kids learning is to build on their curiosity and interests. Bug Buddies is kid-centered with an emphasis on inquiry and creativity.

We've designed the program to be user-friendly and adaptable. Use the materials each day for five days in a row, or once a week, for five weeks, (or any other way you like) to add hands-on learning to your summer, afterschool, or library programming.

**Day 1:** What Are Bugs?

**Day 2:** Bug Life

**Day 3:** Bug Builders

**Day 4:** Bugs in Our Lives

**Day 5:** Bugs and People



### Getting yourself ready

- **Each day has an emphasis on one or more topics related to insects.** You'll find an introduction to the concepts covered and recommended books for each day, as well as a list of questions to guide explorations and activities.
- **Start by gathering books from your library** using the booklists here in the toolkit.
- **Choose both fiction and nonfiction books** from the lists provided.
- **Read them through before you read them to the kids**, so you know what happens and can spot any unfamiliar words or concepts you'll need to explain. Also, look for **places to ask questions** while you're reading to engage listeners.
- **Think about which other parts of the program you'd like to do after reading the books.** An activity is always a good idea, and you may also want to include writing, exploring related websites, videos and apps, and heading outside, too.
- **Familiarize yourself with local insects and places nearby to go to find them.** These resources may be helpful:
  - Insect Identification by State: <https://www.insectidentification.org/insects-by-state-listing.php>
  - County Extension offices: <http://npic.orst.edu/pest/countyext.html>
  - Your local nature center or your local 4-H program: <https://4-h.org/about/find/>
- **Get connected to scientists and others who work in entomology in your area:**
  - Cooperative Extension agencies: <https://landgrantimpacts.org/extension/>
  - Branches of the Entomological Society of America: <https://entsoc.org/membership/branches>
- **Check too with your local college or university** to see if they have an entomology department or find out what insect-related exhibits a local science, natural history, or children's museum might have.



### Learning with the kids

- **Introduce the theme** for the day and ask kids what they know about it. (See “Activating background knowledge” on the next page.)
- **Start with a book.** This is key, especially for kids who may be fearful of insects. Read one or more of the books aloud and ask questions. Listen carefully to the kids’ answers. By reading to them and asking questions, you’ll get them thinking about bugs and what they want to learn, as well as helping them see that most insects aren’t a real threat. You’ll also increase their understanding and excitement, and get them ready for real-life situations with bugs.
- **Read another book and repeat.**
- **Choose a hands-on activity** to let kids explore the theme. By doing an activity, the kids get to use the concepts and new words they have learned.
- **Look for a local connection.** How can you connect the ideas in the books or the activities with the kids’ personal experience? Think about walks outdoors, visiting a beekeeper, or checking on the effects of insects on animal habitats or gardens.
- **Keep asking questions** and listening carefully to the children’s answers.
- **Encourage kids to write** about what they are learning or curious about by using one of the writing prompts in this toolkit, and by keeping a **Bug Journal** for observations, drawings, questions, and creative writing activities.



## Bug Buddies: Introduction

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- **Provide access to books about the topic** for kids to look at on their own.
- **Share digital media with kids** (websites, apps, videos, and games) that they can use to learn more about the topic and give kids time to try them out.
- **Take a field trip** to further explore your topic for the day or theme for the week. Activities for each day will include a **Bug Out!** with special attention to observing insects.

You can choose any of the activities in this toolkit, all of them, or just one or two, but we recommend that you always Start with a Book.

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### Review and teach new words

When you are pre-reading your books or looking at activities, websites, apps, or field trips, look out for words kids might not know. Take time to talk about those words and tell kids what they mean. You can provide images, video, and real objects to help them build an understanding of unfamiliar words. You can even act words out! You can do this before you read, before you do an activity, or while you are reading or trying a hands-on activity.

If words or concepts are being repeated, ask kids if they remember what they mean and how they might be used the same way or differently in this new context.

The glossary of **Bug Words** on pages 94–98 can help you define terms that kids might not be familiar with.

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### Activating background knowledge

Ask kids what they know about bugs and insects as you begin this program:

- What makes an insect an insect?
- How are insects helpful or harmful?
- Why is knowing about insects important to us in our everyday lives?
- How do insects impact our world and how people live?
- What do you wonder about bugs?

### Connecting the days and concepts

Children will learn more readily and remember more if you review all five days of materials in advance and decide which books and activities you want to use. Connecting the ideas and activities day to day will help them create a big picture.

At the beginning of the day, ask them, *“What did we talk about yesterday?”* Then tie their answers to the focus for the day.

You may choose to use all the days or you may select specific days for your program. You may select different activities; however, the **daily Bug Out!** is critical in helping children connect ideas with their everyday environment, as well as providing opportunities for observation and reflection.

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### Bug Out!

Encourage exploration and a chance for kids to discover nature when you Bug Out every day. Making bug watching a daily experience provides opportunities to practice observation and data recording skills, facilitates real-world interaction with the environment and STEM, and supports kids’ connection to their own communities and the larger world. It also demonstrates, in a very concrete way, how nature, science, technology, and curiosity/exploration are part of our everyday lives. Daily resources to help Bug Buddies successfully Bug Out include ideas for observing and identifying insects and other arthropods, Bug Journal tips and writing prompts, and a Bee a Bug Buddy activity to encourage kids to help insects.



You never know quite what you are going to find when you Bug Out. To fire up kids’ powers of observation before heading outside, talk about where you’ll be exploring and what kinds of creatures are often found there. Encourage kids to choose an insect they really want to see. Let them take a look at the insect in a field guide and read up on its habits and habitat.

Each day you Bug Out, you can plan to visit a wide variety of habitat types or visit the same spot every day. You don’t need to go far. Some of the best bug watching can be in your own backyard! Insects and other arthropods can be seen on city and suburban sidewalks as well as in parks, yards, and nature preserves.



## Bug Buddies: Introduction

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If you Bug Out to a wildlife area, kids also need to know that it is important to stay on trails to avoid causing damage to the land, plants, and trees. Bug Buddies also need to leave rocks, plants, flowers, feathers, and other objects of interest as they find them and give others the chance to make the same exciting discoveries. If kids turn over a rock or a fallen log to look for insects, they should move it back where they found it after making their observations. Have kids make use of the Bug Journal or take a photograph to enjoy their finds. An adult can take the photographs if Bug Buddies don't have access to a camera.

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### Before you Bug Out

**Be bug safe.** Some insects sting or bite. Bug Buddies with allergies should always practice extra careful observation with an adult's supervision. Wearing long sleeves and tall socks can offer some protection to Bug Buddies. Avoid wearing bright colors, which can attract pollinators to your clothes.

Help Bug Buddies identify which bugs are best observed from a distance, such as wasps, bees, ants, and other arthropods such as spiders. Make sure that Bug Buddies know not to swat or wave their arms at bees and wasps that might fly around them, but to walk away calmly and quickly. Emphasize to Bug Buddies that they should only handle insects and other bugs that they know are safe to touch.

**Set expectations.** Explain to kids that they may not always see a wide variety of insects but there will be more opportunities to Bug Out and a chance to look for bugs anytime they go outside. Help Bug Buddies understand that insect observation is a slow-paced activity that may be very different from their other experiences outdoors. Set this expectation ahead of time and tell kids, "We are going to walk slowly and make many stops to listen, look, and observe." They may need to stay still for a while, alert for sound and motion, in order to see bugs. But even if they are only casually taking note of their surroundings, the more they pay attention to bugs, the more kids will notice them wherever they are. Remind Bug Buddies not to touch or disturb insects, other animals they find, or habitats. If they move a log or leaves to look for insects, remind them to gently replace it when they are done.

**Talk about what an observation is and how to make them.** Kids have sharp observation skills and natural abilities to use their senses. Model the behavior you expect to see as you encourage them to focus attention on their surroundings, slow down, and use their senses of hearing and sight and be curious about what they see and hear. Observation requires patience and focus.

**Provide directions on how to take notes or set up Bug Journals** with an observation chart that helps kids make drawings and notes about the creatures they see. Notes can include the following: number of legs, number of antennae, number of body parts, wings, small identifying details, habitat, and behavior.

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### Bug journal

Journaling gives kids the opportunity to use drawing and writing together to show their observations, document their discoveries, pose questions, note their ideas, and learn to see and hear more. Keeping a Bug Journal is a great way to get your Bug Buddies outdoors to explore and record their responses to and reflections about science and the natural world and keep track of what they're learning. Get kids started on their journals with information that will help them keep track of what they wonder, identify insects, and provide them with some of the words they'll need to record their observations.

#### Supplies:

- Blank spiral notebook or sketchbook (or fold 10 sheets of paper in half and staple along the fold to create a booklet.)
- Bug Buddies journal cover (optional) — find the printable in the Appendix
- Writing tools
- Drawing materials



## Bug Buddies: Introduction

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Let kids know that their journals can look however they want them to look! Kids can freely draw, write, or add photographs. It can be a place to brainstorm, keep notes and vocabulary words, make lists, sketch, or write poems. Tell them it is their place to write and draw their observations, thoughts, questions, and ideas, and as a Bug Buddy, they will have a chance to make all kinds of observations and explore things that grab their curiosity.

Talk with kids about how scientists keep notes and journals of their observations, data, and experiments. Writers keep journals of their observations and feelings about people and places. As Bug Buddies, ask them how they think they could use a journal.

Each Bug Out! experience includes writing activities and prompts, but you can get kids thinking more about how they want to use their Bug Journals. Share these sentence starters:

I see ...

I hear ...

I wonder ...

I was surprised by ...

I feel ...

This drawing shows ...

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## Bee a bug buddy

Each Bug Out! session also includes an activity focused on helping insects or educating people about insects and their important role in our ecosystems and lives.





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### Bug Buddies toolkit creators

#### **Rachael Walker (co-author)**

Rachael has more than 30 years of experience developing partnerships with nonprofit organizations, corporations, and public agencies to benefit children and families. She launches national campaigns, coordinates special events, and develops original content for the National Education Association, Random House Children's Books, PBS, and WETA's Learning Media initiatives (Reading Rockets, Colorín Colorado, and AdLit.org). Visit Rachael at [Belle of the Book: https://www.belleofthebook.com/](https://www.belleofthebook.com/)

#### **Eileen Hanning (co-author)**

Eileen has more than 20 years of experience designing reading curriculum for underserved kids and training for their parents and social service providers about reading and child development. Her passion for children's books and hands-on learning has led her to review children's books, learn, research and write about education, child development and toxic stress, and to create her own consulting company, ReadLearnReach (<https://readlearn-reach.com/>), where she serves a variety of clients with their curriculum, training, children's book, and writing needs. She has developed curriculum for Random House, WETA, Reading Is Fundamental, the Girl Scouts of America, and Red Comet Press, and researched and written white papers for Tales2Go and Girls on the Run of Northern Virginia.

#### **Alonso Abugattas, Jr. (expert reviewer)**

Alonso is the Capital Naturalist on social media and Natural Resources Manager for Arlington County Parks in Virginia. He has 30+ years as a professional naturalist.

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#### **Tina Chovanec (design)**

Senior Director, Start with a Book and Reading Rockets

