



BEAUTIFUL BUGS

Activity Book



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Introduction to Bugs

Welcome to the wonderful world of bugs, a wide range of creeping, crawling, scuttling, skittering—and, of course, flying—critters. Bugs are fascinating to study due to their life cycles and behaviors, their roles in maintaining (and sometimes threatening) ecosystems, and their variety.

There are more species of insects than of any other type of animal. In the United States alone, scientists estimate a count of 91,000 identified or described species and perhaps 73,000 more that have not yet been described. One thing is certain: when exploring the world of bugs, you will find plenty of creatures to capture your curiosity and imagination.

What exactly is a bug? Well, that answer can be tricky. But when we're talking about them in this activity book, we mean any creepy-crawly creature. For example, there are insects, whose body structures you'll learn about on the next page; arachnids, such as spiders and other eight-legged creatures; myriapods, including centipedes and millipedes; and crustaceans, including one special bug featured on a not-too-distant page.

Like all living things, bugs play important roles in maintaining the health of their ecosystems. Some bugs prey upon other bugs, keeping their populations in check. Some bugs are important food for other animals. Some bugs enrich soil, allowing plants and trees to grow. Some bugs even help clean the water they live in. When you learn how each bug contributes to its environment, you might gain a new appreciation for how important these little critters are.

Of course, bugs have been known to, well, "bug" us too. Some are bothersome or even dangerous to humans. Some invasive bug species can disrupt and damage their ecosystems. We'll explore the less pleasant side of bug life in these pages, as well. But remember that all bugs play a vital role on Earth. They are far more beneficial to humans and other life than they are harmful.

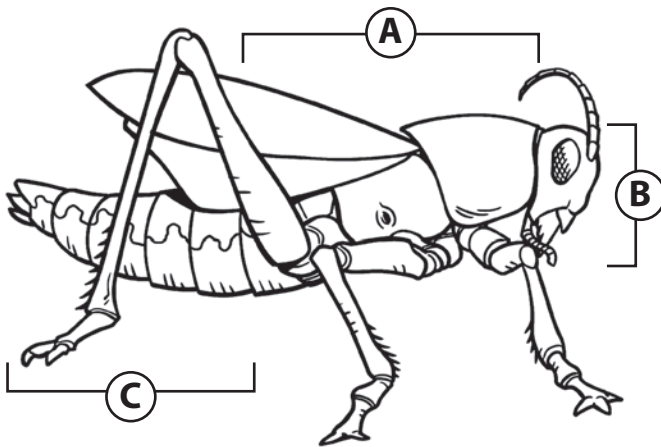
You can observe bugs wherever you find them—and you can find them almost anywhere: in gardens, on trees, in the soil, at the park, at the beach, even inside your home. All you need is a little patience and a bit of curiosity to learn about these weird, wild organisms. Ask questions, keep track of your observations, and share your interest with friends and family. The world of bugs is sure to win over anyone with a love of the living world!

Insect Anatomy

Most of the creatures in this activity book are insects. Adult insects share a similar basic anatomy, or body structure. Here are some of the key features you'll notice when observing insects:

A Three-Sectioned Body

1. The **head** is where you'll find the insect's eyes, antennae, and brain. Many insects' eyes are compound, or made of several visual units that work together to produce vision. The "brain" is really more a bundle of nerve cells; it's not nearly as complex as the brains of mammals and other animals.
2. The **thorax** contains most of the insect's muscles. This is also where its legs and wings (if applicable) are located.
3. The **abdomen** holds the insect's digestive and reproductive organs, as well as sting organs (if it has them). For example, you'll see a bee's stinger poking out the end of its abdomen.



Use the clues above to label the insect's body sections:

- A** _____
- B** _____
- C** _____

Three Pairs of Jointed Legs

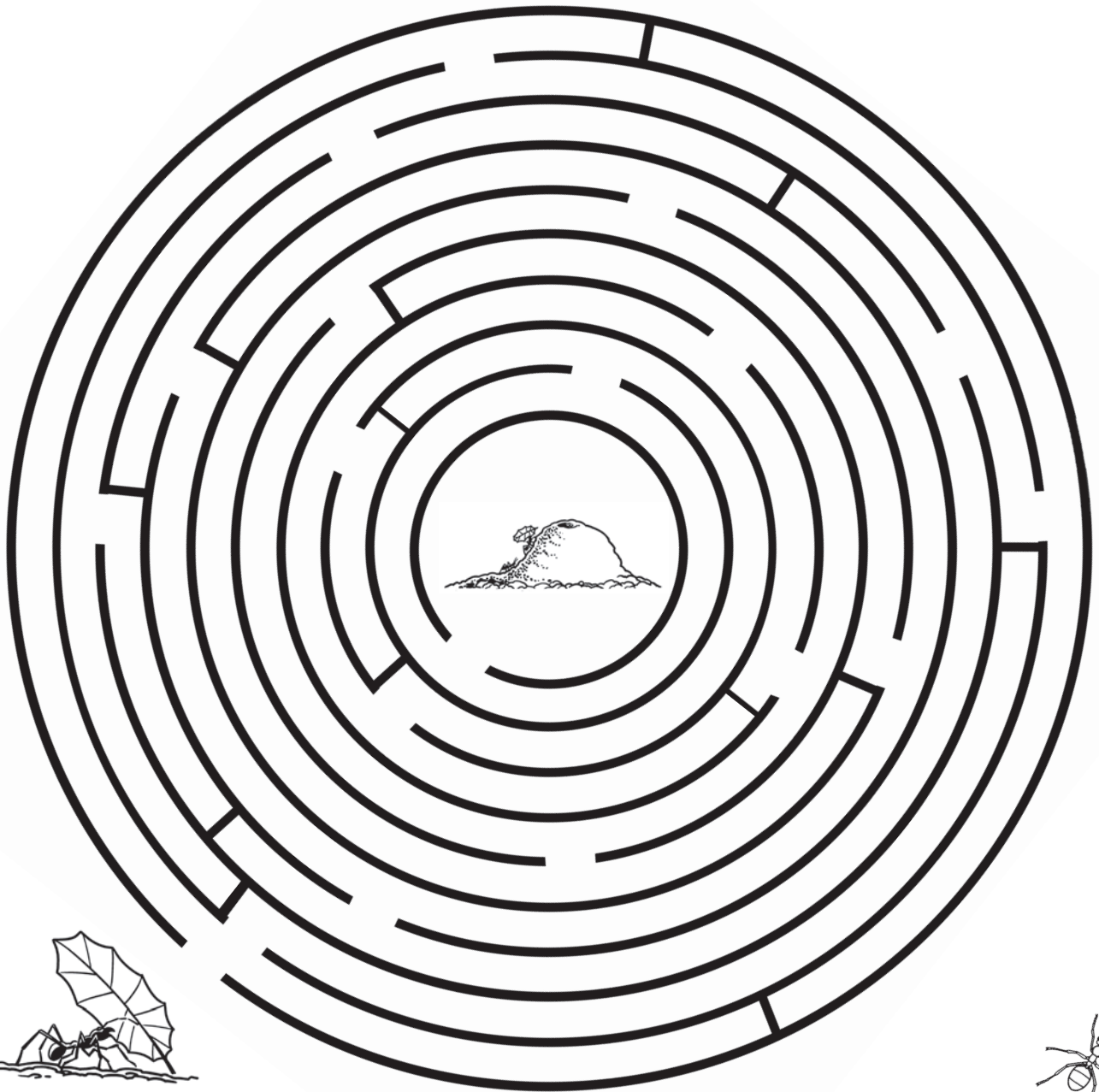
Six legs emerge from the insect's thorax. Most adult insects also have wings—usually two pairs—that are attached to the thorax.

A Hard Exoskeleton

An exoskeleton is the insect's body armor. It is made of a substance called chitin (KITE-in), which is a bit like hard plastic. An insect must molt, or shed its exoskeleton, as it grows. Don't worry; the insect grows a new exoskeleton to replace the old.

Ant

Ants live in colonies. They cooperate to find food and protect their community. There are three types of ants within each colony: queens, males, and workers. Worker ants are the ones you're most likely to see. They can lift up to 20 times their own body weight. You might see a worker ant carry a piece of food much larger than itself.



Help the ant reach the anthill.



Actual Size
(about 0.4")

**Fun
Fact!**

To date, the largest ant colony was found in southern Europe. Scientists believe that it spreads out beneath the surface for 3,700 miles!

Aphid

These tiny, soft-bodied insects can often be found living in colonies of hundreds—even thousands—on plant stems or the bottoms of leaves. Aphids attach to young plants to feed on the plants' juices. Some ants protect aphid colonies. These ants feed on the sweet secretions that aphids produce, known as honeydew.



Actual Size
(about 0.1")

When one plant gets too crowded with aphids, some of the adults develop wings and fly away to begin a colony on a new plant!

**Fun
Fact!**

The Size of Bugs

Bugs come in many shapes and sizes. It can be confusing to figure out how big they are. Some have really wide legs, some have long antennae, and some have stingers. To keep it simple, we ignore all of that when measuring a bug. A bug's size is the distance from the front of its head to the end of its body.

Bugs are measured from the front of the head to the end of the body.



Lice: ____"



Weevil: ____"



Aphid: ____"



Ladybug: ____"



Tick: ____"



Lovebug: ____"



Chigger: ____"



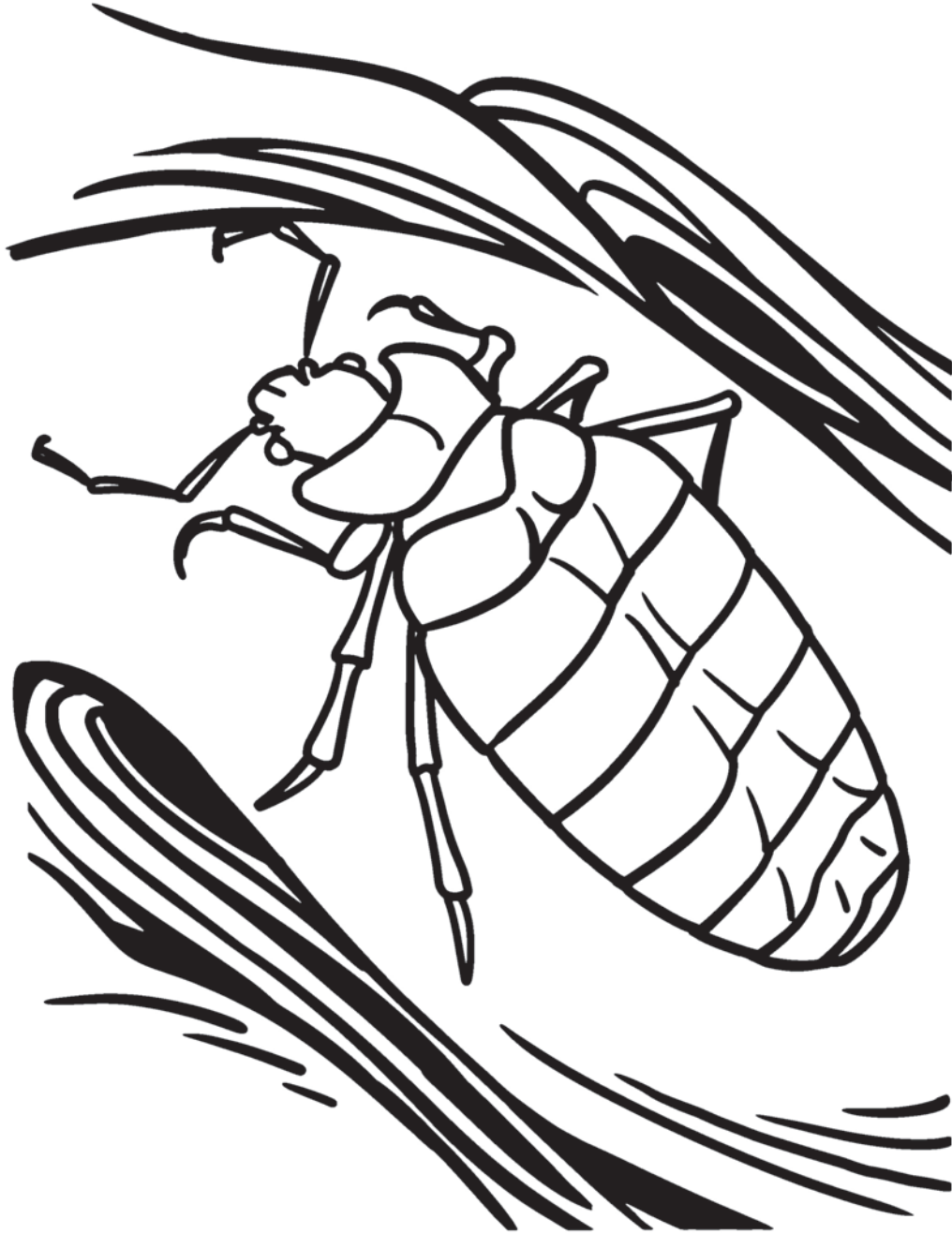
Flea: ____"

Game Time!

The bugs shown above are too big! Find them in this book and write down what their actual size might be if you spot them (with very keen vision) in nature.

Bed Bug

Bed bugs are tan- or brown-colored parasites that are smaller than a penny. They like to live in mattress seams and bed frames to feed on human blood, usually at night. Their bites aren't very dangerous—bed bugs don't spread diseases—but they are annoying and itchy. Bed bugs can appear brownish-red after they've eaten.



Actual Size
(about 0.3")

What's the longest that you've ever gone without food? Bed bugs have you beaten. They can survive several months without feeding!

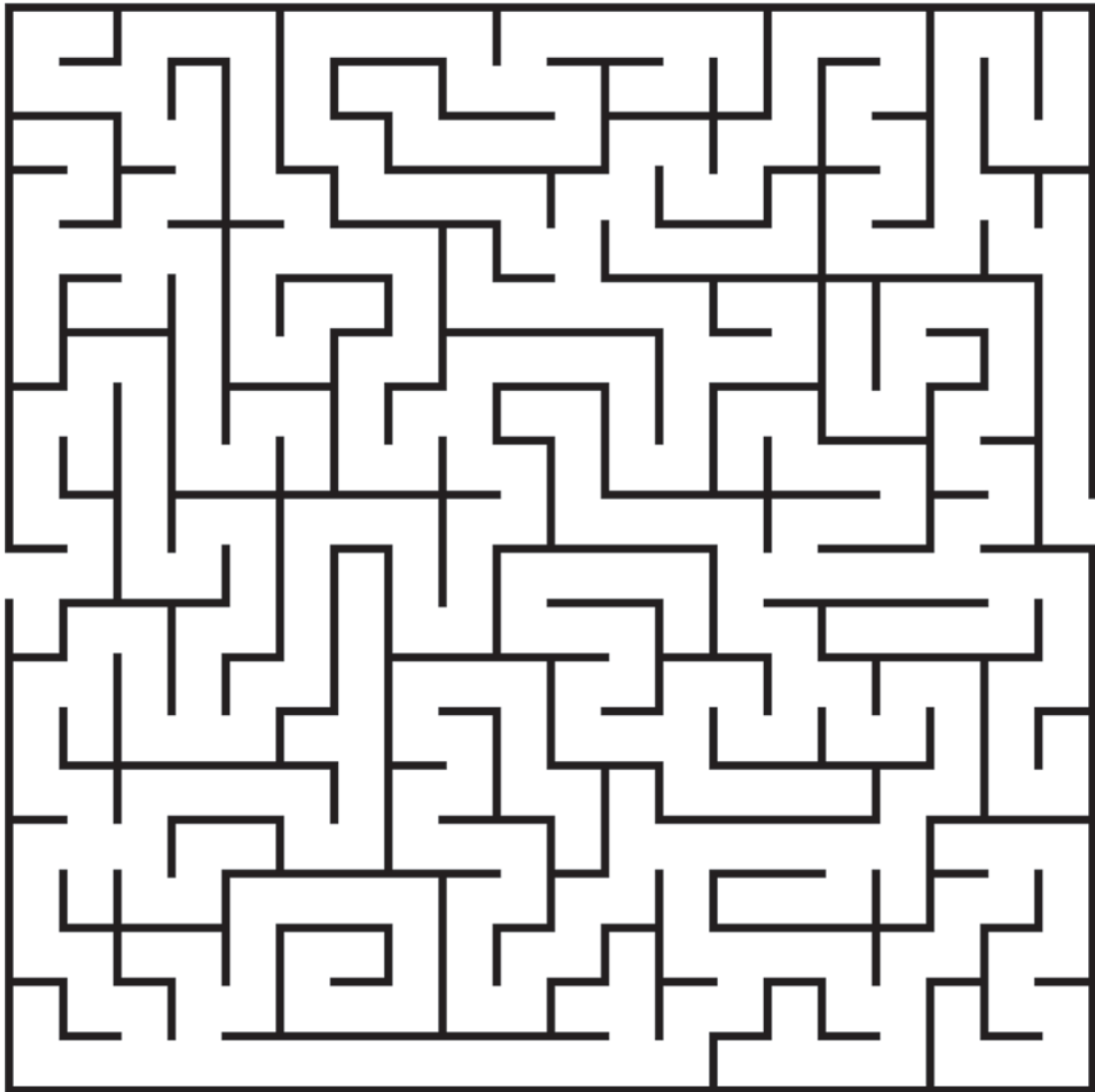
**Fun
Fact!**

Bee

Bees are sometimes feared for their sting, but they do a lot of good. Bees are pollinators, which means they collect pollen and nectar from inside flowers. They bring these to their hive to eat. As they move from plant to plant, bees transfer pollen, allowing the flowers to reproduce.



*Help the
honeybee
pollinate
the flower.*



Actual Size
(about 0.5")

**Fun
Fact!**

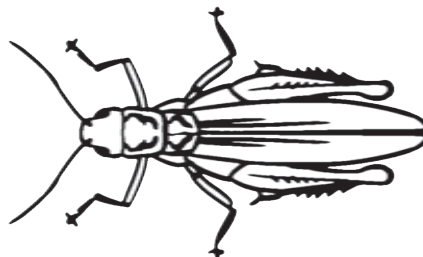
How important are bees and other pollinators (like beetles, butterflies, and moths)?
More than half of all food crops depend on bees and other pollinators to grow!

Is That an Insect?

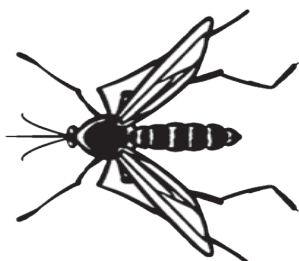
There are countless different kinds of bugs in the world—but not all of them are insects. As we learned on page 3, you can usually tell it's an insect if it has a three-sectioned body (head, thorax, and abdomen), six legs, and an exoskeleton. Name the bugs below. Circle the ones that are insects.



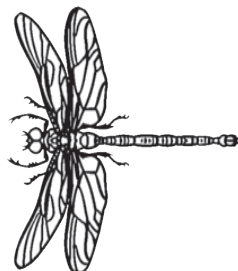
1. _____



2. _____



3. _____



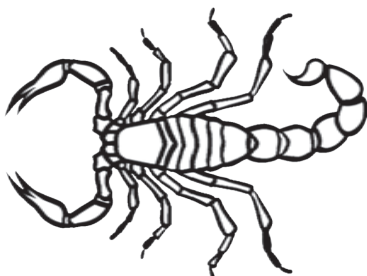
4. _____



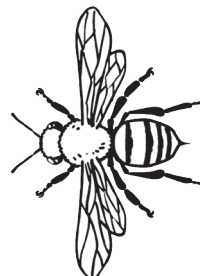
5. _____



6. _____



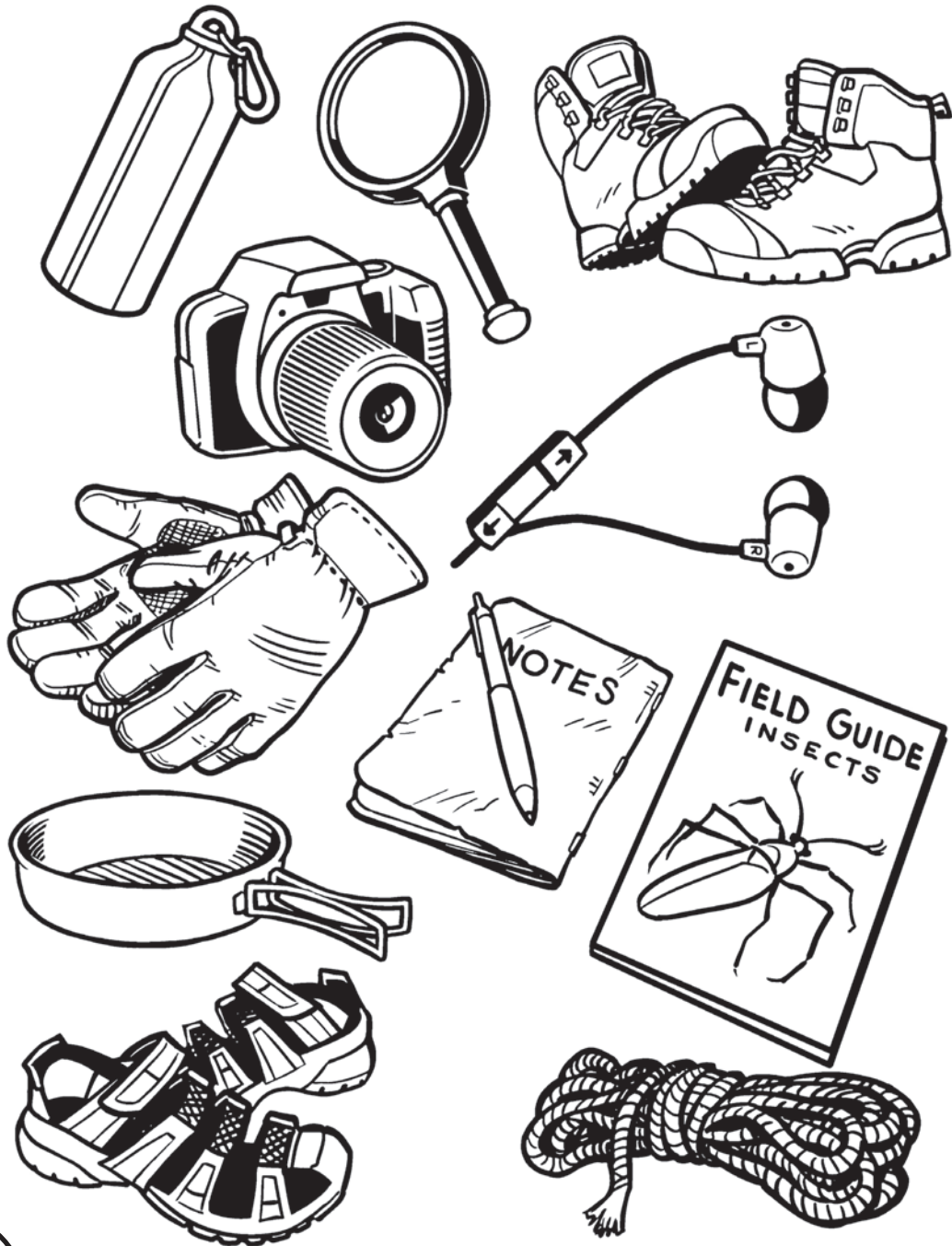
7. _____



8. _____

Bug Hunt

Finding bugs is easy with some basic tools and an adult's help. Look under leaves, wood, and rocks. Check inside flowers. Dig in the dirt. If you want to keep finding bugs in the future, protect their living spaces by putting everything back where you found it. If you think a bug might sting or bite, observe it from a distance.

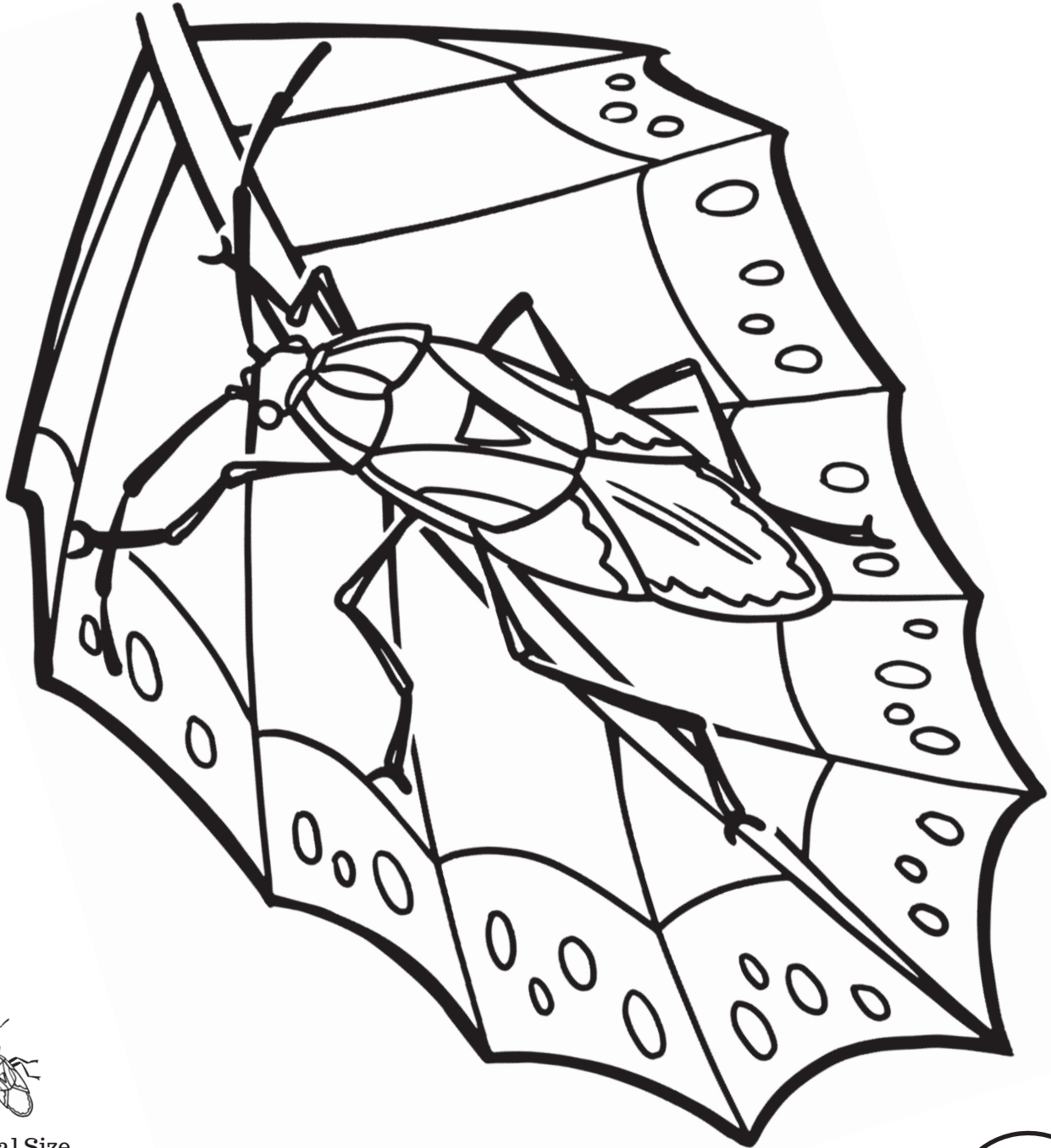


**Game
Time!**

Prepare for your bug hunt by gathering some basic tools. Color the items pictured above. Circle the ones that you would bring on a bug hunt.

Boxelder Bug

Boxelder bugs are named after a type of maple tree. These bugs like to eat the boxelder tree's sap. In spring and fall, boxelder bugs gather on the trunks of trees and on the sunny sides of buildings. They like warm temperatures, so they might find their way into your home when the weather gets cold.



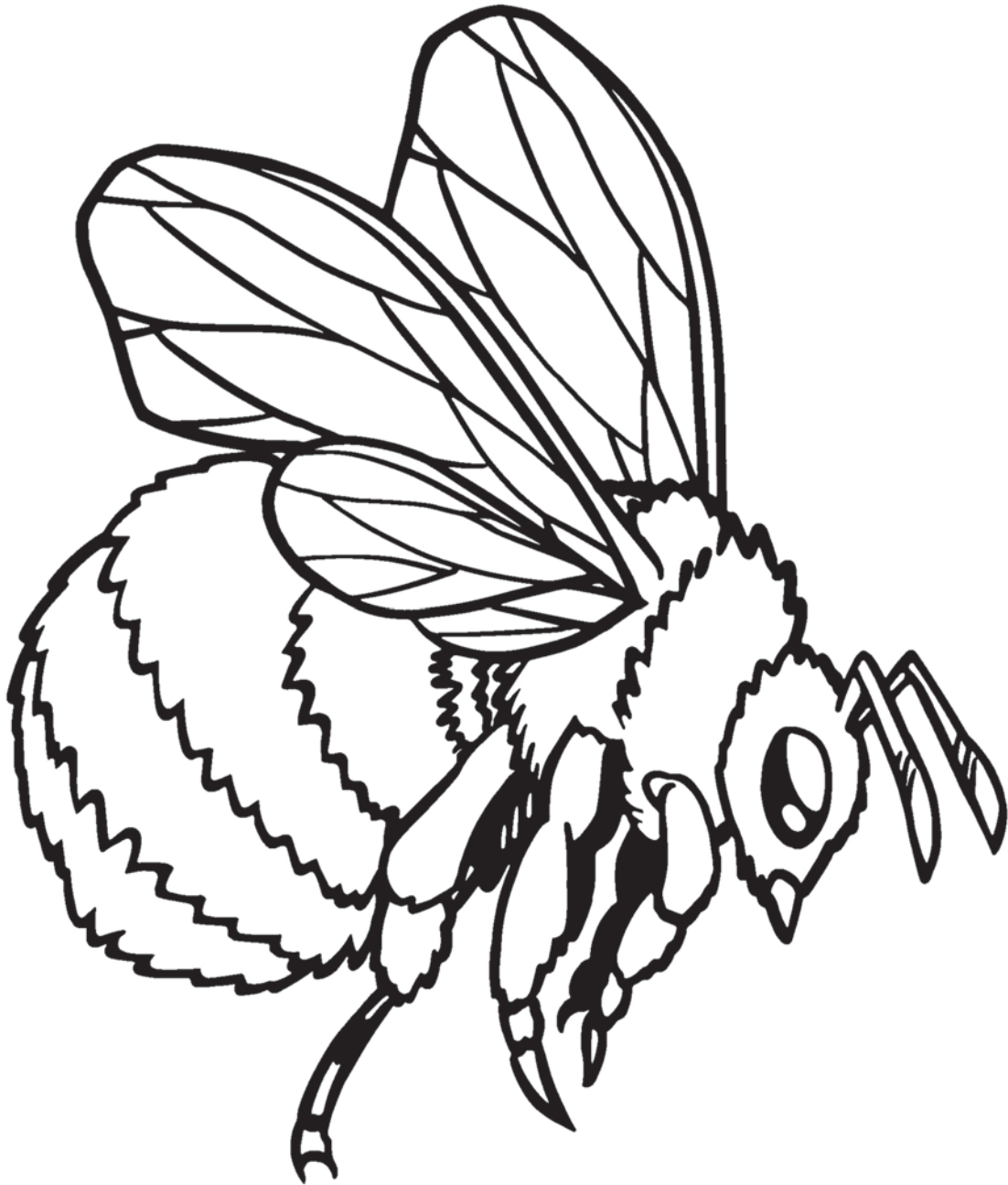
Actual Size
(about 0.5")

Boxelder bugs don't worry much about predators because of their smell. They stink when disturbed, and that's sure to sour a hungry bird or squirrel's appetite!

**Fun
Fact!**

Bumblebee

Bumblebees are great pollinators. Their large size and fast-moving wings cause flowers to release more pollen, which helps flowers to reproduce. Bumblebees generate more heat than honeybees, so they can work in cooler weather. Female bumblebees do sting (and can sting more than once), but they rarely do.



Actual Size
(about 0.5")

Fun Fact!

Like all bees, Bumblebees leave behind smelly footprints, signaling to other bugs that a flower has already been pollinated. The smell also guides the bees back home.

Bug Hangouts

You can have a lot of fun watching bugs in nature, but you need to know where to look. In most places, a person can find bugs without much trouble. A few good places to look are listed below. Find those words in the puzzle and circle them.

A I L E
 G R A D S E R O
 A R W E B P T A V I
 V O A N B O R V I U
 O H S A R K E L
 C A S C A S
 B U G A O E G H A T N A O
 R G A R D E N M R L F L O W E R S
 W O O D P I L E I N T H E A I R
 L D W S N A G V I V E S
 D R T U H B E
 C O R W S T A K R
 A I D E T R E T
 B D V K X V O E I R
 O E A H R S E E
 L M T O W

BASEMENT
DIRT
FLOWERS
IN THE AIR

GARDEN
GRASS
LAKES
LEAVES

PORCH LIGHT
RIVER
TREE
WOOD PILE

Butterfly or Moth?

Butterflies and moths are some of the most beautiful bugs in nature, but it's not always easy to tell them apart. Both have papery wings covered in tiny scales that help to protect them. And both go through larval, pupal, and adult phases. This means they appear as caterpillars, then chrysalises or cocoons, and then adults.



Which Is Which?

A noticeable difference between moths and butterflies is their antennae. Butterflies have long, slender antennae with small bulbs at the ends. Moths' antennae are shaped like tiny feathers.

When they land, butterflies tend to hold their wings upright on their backs, while moths often rest with their wings spread flat.

Butterflies tend to be more colorful than their moth cousins.

Butterflies typically fly around during the day. Moths are more likely to come out at night and are attracted to lights.

(NOTE: These identification tips are true most of the time, but there are exceptions.)

Can you tell which bug shown above is a butterfly and which is a moth? Color them both. Draw a circle around the butterfly and a square around the moth.

**Fun
Fact!**

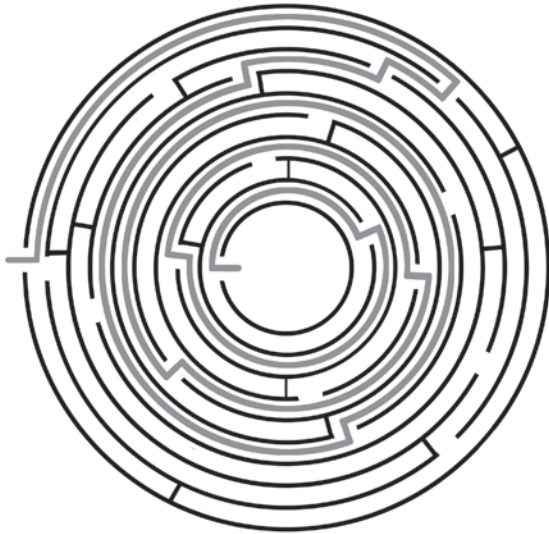
Moths' and butterflies' tiny scales rub off and seem like powder if you touch their wings! Don't worry. As long as you're gentle, they can lose a few scales without injury.

Answers

Page 3—Insect Anatomy

A. Thorax; B. Head; C. Abdomen

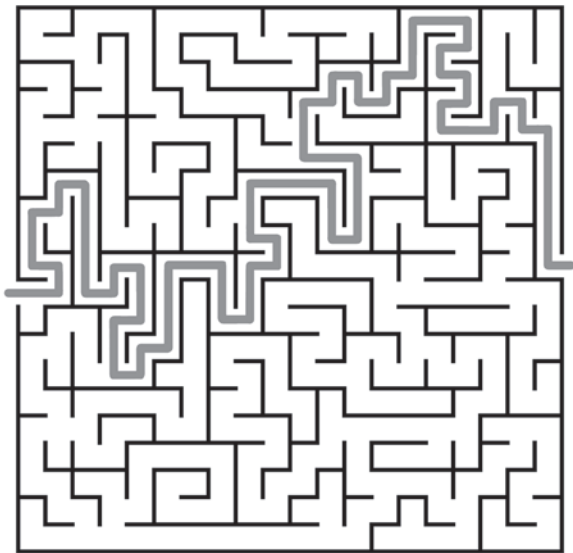
Page 4—Ant



Page 6—The Size of Bugs

Lice: 0.1"; Weevil: 0.2"; Ladybug: 0.3"; Tick: 0.1";
Aphid: 0.1"; Lovebug: 0.3"; Chigger: 0.01"; Flea: 0.1"

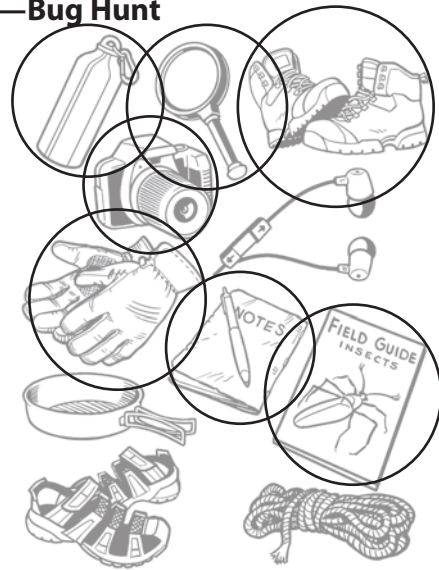
Page 8—Bee



Page 9—Is That an Insect?

1. Earthworm; 2. Grasshopper; 3. Mosquito;
4. Dragonfly; 5. Ladybug; 6. Spider; 7. Scorpion; 8. Bee

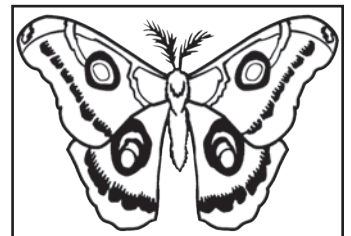
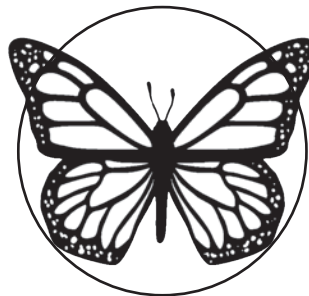
Page 10—Bug Hunt



Page 13—Bug Hangouts

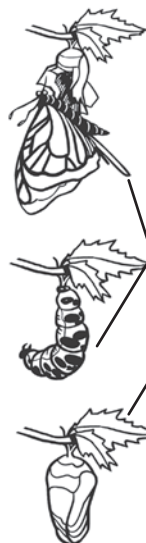


Page 14—Butterfly or Moth?



Answers

Page 15—Caterpillar



Caterpillars do a great deal of eating and not much else. They must munch on a lot of plants—thousands of times their own body weight—in order to develop into healthy adults. Caterpillars do not move quickly, so they are easy prey. Many camouflage themselves to remain hidden on plants. Others are brightly colored to warn bugs, birds, and other predators that they are toxic to eat.

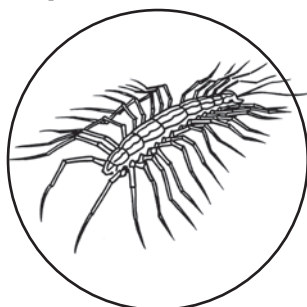
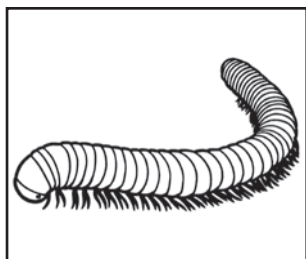
During the third stage, or pupal stage, moth caterpillars form silky cocoons around themselves. Butterfly caterpillars form hard, shiny chrysalises. In this way, caterpillars protect themselves while they do some major growing up. The caterpillar digests itself, creating a soupy caterpillar ooze. Some key parts of the caterpillar survive the digestion, though. These begin to develop into adult body parts. This process can take a few weeks to a couple of years.

Finally, the adult stage arrives, and the caterpillar emerges as... not a caterpillar at all! It is a wrinkled, wet, not-exactly-new moth or butterfly. As an adult, the bug's main job is to reproduce. Many species of adult moths and butterflies do not eat at all. So it's a good thing they stuff themselves so heartily as caterpillars.

Page 27—More Beetles to Know



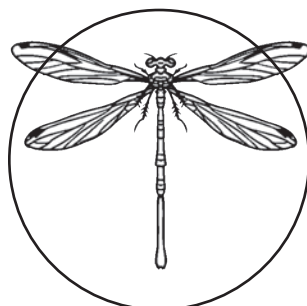
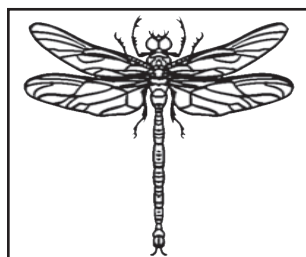
Page 17—Centipede or Millipede?



Page 24—Secret Code

All insects are bugs, but not all bugs are insects.

Page 25—Damselfly or Dragonfly?



Page 31—Where to Look?

Bee → flower

Firefly → air

Ant → ground

Moth → light

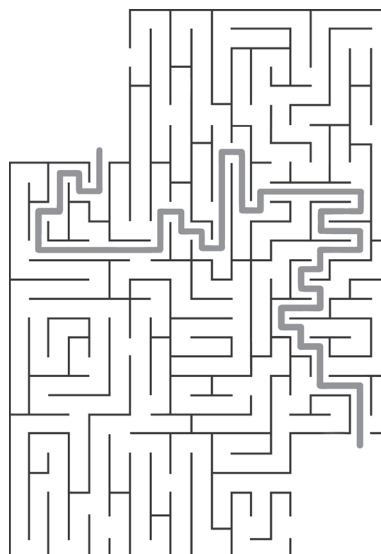
Page 32—Firefly

True: In some places (such as Great Smoky Mountains National Park), fireflies do flash in tandem!

Page 36—House Fly or Deer Fly?



Page 37—Inchworm

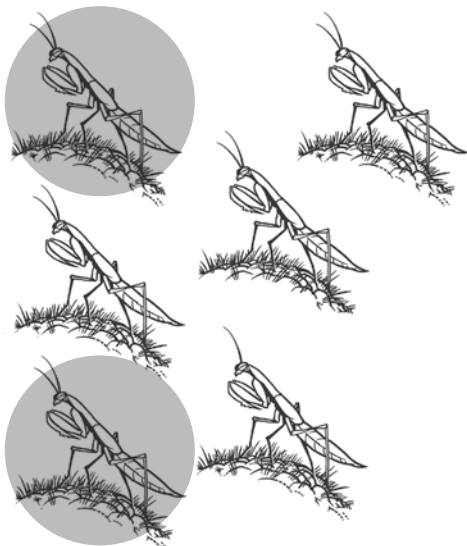


Page 40—Ladybug

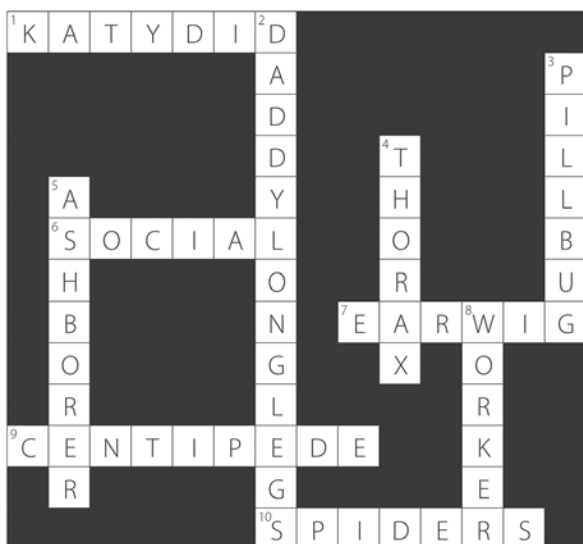
Page 41—Word Scramble

Page 42—Lice

Page 48—Praying Mantis



Page 53—Bug Crossword



Page 49—Scorpion

Page 57—Walking Stick



Page 61—More Spiders to Know



About the Author

Jennifer M. Mitchell loves the outdoors. She hikes, bikes, runs, gardens, and generally enjoys being outside. She is particularly fond of exploring the trails near her home north of Denver, Colorado, with her daughter. Jennifer is a high school English teacher and a poet. She enjoys traveling and spending time with her family and friends.

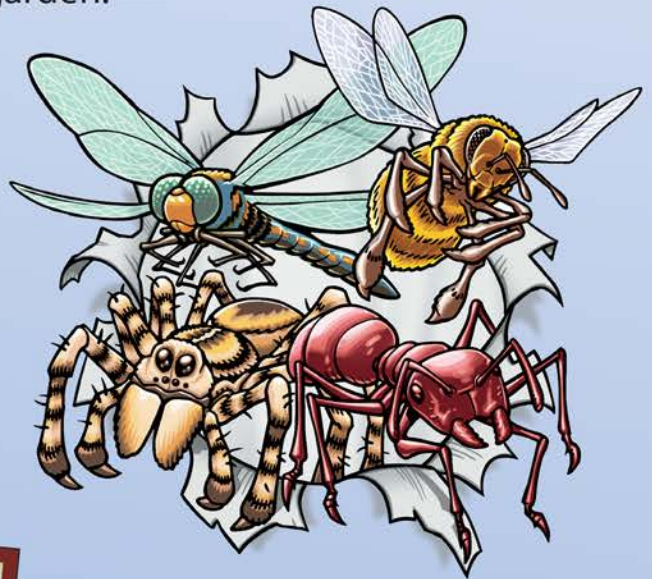
COLOR AND LEARN ABOUT INSECTS, SPIDERS, AND OTHER CREEPY-CRAWLIES!

Bugs capture our attention, fascinate us, and spark our imaginations. This is especially true for children, who could watch, chase, and study them for hours. The *Beautiful Bugs Activity Book* is an amazing educational tool! Your budding bug lover will learn important details about nearly 50 kinds of bugs, including ants, bees, beetles, butterflies, fireflies, mosquitoes, and more. Coloring pages present astounding facts. Activities like word finds, mazes, and dot-to-dots reinforce the information in creative and unique ways. Plus, the activity book offers ideas for family fun, from going on a bug hunt to building a bug-friendly garden.

FEATURES

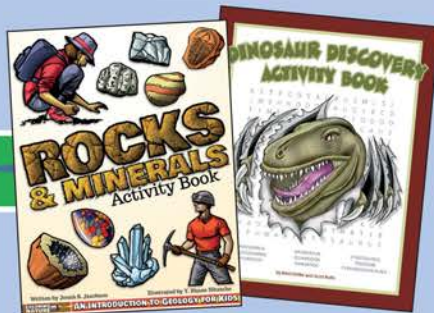
- Beautiful illustrations to color
- Fun activities for children of all ages
- Fascinating educational information

There's plenty of buzz about this coloring and activity book. It's packed with useful information in an engaging format!



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