

Bugs!

Description

Learners collect invertebrates for observation, determine which invertebrates are insects and which are noninsects, explore insect structures and functions, ask questions about insects, learn the differences between bugs and other insects, and use a key to identify a variety of invertebrates.

Suggested Grade Levels: 3–4

Lesson Objectives Connecting to the Standards

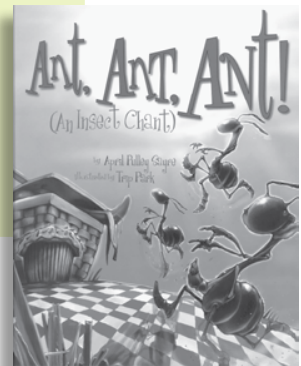
Content Standard A: Scientific Inquiry

K–4: Ask a question about objects, organisms, and events in the environment.

K–4: Employ simple equipment and tools to gather data and extend the senses.

Content Standard C: Life Science

K–4: Understand that animals have different structures that serve different functions in growth, survival, and reproduction.



Featured Picture Books

Title ***The Perfect Pet***
 Author **Margie Palatini**
 Illustrator **Bruce Whatley**
 Publisher **Katherine Tegen Books**
 Year **2009**
 Genre **Story**
 Summary **Elizabeth really wants a pet, but her parents do not. After all of her suggestions are vetoed, she finds just the right one: an insect.**

Title ***Bugs Are Insects***
 Author **Anne Rockwell**
 Illustrator **Steve Jenkins**
 Publisher **HarperCollins**
 Year **2001**
 Genre **Nonnarrative Information**
 Summary **The main differences between insects and arachnids are explained, as well as what makes a bug a bug.**

Title ***Ant, Ant, Ant! (An Insect Chant)***
 Author **April Pulley Sayre**
 Illustrator **Trip Park**
 Publisher **NorthWord Books for Young Readers**
 Year **2005**
 Genre **Poetry**
 Summary **An ant and 59 other American insects appear in a catchy chant. Although the bright, digitally produced caricatures are not always scientifically accurate, this book is a fun survey of insect names.**

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Time Needed

This lesson will take several class periods. Suggested scheduling is as follows:

- Day 1: **Engage** with *The Perfect Pet* read aloud and *The Perfect Pet* Anticipation Guide
- Day 2: **Explore** with Collect a “Pet” Invertebrate
- Day 3: **Explain** with Card Sort and *Bugs Are Insects*
- Day 4: **Elaborate** with Invertebrate Dichotomous Key
- Day 5: **Evaluate** with *The Perfect Pet* Anticipation Guide (post), *Ant, Ant, Ant! (An Insect Chant!)*, and Entomology Convention poster project
- Day 6 and beyond: Continue insect research and hold Entomology Convention

Materials

(per pair)

- Aquarium nets for collecting small invertebrates (2 in. to 6 in. size)
- Clear Lucite magnifying “Bug Box” (1 in. or 1.5 in. cubes) or petri dishes with lids
- Hand lenses
- Large insect sweep net (optional)
- Centimeter rulers
- Poster board
- Markers
- Safety glasses or goggles

Bug Boxes available from

www.Acornnaturalists.com

www.insectlore.com

www.Nature-Watch.com

Student Pages

- *The Perfect Pet* Anticipation Guide
- My “Pet” Invertebrate
- Invertebrate Sorting Cards
- Invertebrate Dichotomous Key
- Insect Poster Rubric

Background

Insects are a remarkable group of animals and a source of delight (and sometimes apprehension) for many children. Not only do insects make interesting specimens to use for exploring animal structures and functions, but collecting, observing, sharing discoveries, and asking questions about insects can help students develop an understanding of what science is and how scientists do their jobs. Learning to treat insects gently during collection and observation can also help students develop a sense of responsibility toward living things.

Animals are living things that eat other living or once-living things and digest food inside their bodies. Most animals are motile, meaning they can move spontaneously. The animal kingdom

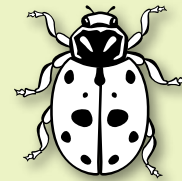
can be divided into two broad categories: *vertebrates*, which are animals with backbones, and *invertebrates*, which are animals without backbones. Invertebrates make up more than 95% of all animal species on Earth! Some main groups, or *phyla*, of invertebrates (generally classified by their body plans) are mollusks, sponges, segmented worms, and arthropods. *Arthropods* have exoskeletons, segmented bodies, and at least three pairs of legs. This group includes arachnids (e.g., spiders and scorpions), crustaceans (e.g., crabs and lobsters), and insects.

Insects can be classified into about 28 main subdivisions, called *orders*. This number varies depending on whom you ask because some insect taxonomists organize the insects according to physical traits, while others use evolutionary links. The largest insect order by far is Coleoptera—the *beetles*. Beetles have a distinctive line down the middle of their backs where their hard outer wings meet. Some people call all insects “bugs,” but this label is not correct. True bugs belong to their own insect order, Hemiptera. They are characterized by beaklike mouths that are designed for piercing and sucking. Many of the true bugs also have triangular shapes on their backs made by their overlapping wings. See Figure 21.1.

Some examples of true bugs are stinkbugs, bedbugs, and water striders. Ladybugs and lightning bugs are actually beetles. *Entomologists* (scientists who study insects) have identified more than one million different *species*, or distinct groups, of insects, which is more than twice the number of all other animals combined! Some entomologists believe there may be millions more yet to be discovered.

In this lesson, students go on a hike to collect and observe live invertebrate specimens. They find out how to tell if an invertebrate is an insect or not after learning that all insects share the following structures (see Figure 21.2): *exoskeletons*, three main body parts (*head*, *thorax*, *abdomen*), three pairs of *legs* (attached to the thorax), usually two pairs of *wings*, and usually one pair of *antennae*. The common misconception that insects are not animals is addressed, and students learn to treat all animals, no matter how small, with respect. They find out that a bug is a special type of insect, and they learn how to use a dichotomous key to identify a variety of invertebrates. Finally, they share their research about an insect of their choice with other student entomologists at an Entomology Convention, similar to gatherings that real-world scientists hold.

Here is an example of how one insect, the Convergent Ladybird Beetle (a type of ladybug), is classified:



Kingdom: Animalia (animal)
Phylum: Arthropoda (arthropods)
Class: Insecta (insects)
Order: Coleoptera (beetles)
Family: Coccinellidae
Genus: *Hippodamia*
Species: *convergens*

Figure 21.1. Stinkbug

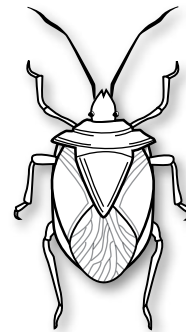
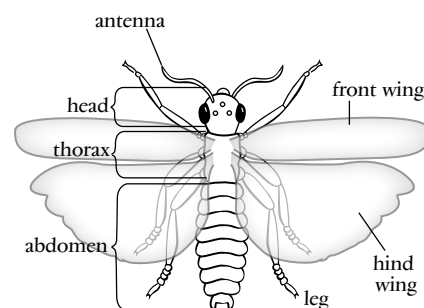


Figure 21.2. Insect anatomy



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Engage

Making Connections



Turn and Talk

Show the cover of the book *The Perfect Pet*, and introduce the author and illustrator. Ask students to turn and talk with a partner about what they think the perfect pet would be and why. Then read the book aloud. After reading, ask

- ? Is this book fiction or nonfiction? How do you know? (The illustrations look like cartoons; the bug has a human face; it has none of the features of nonfiction, etc.)
- ? Why does Elizabeth think Doug is the perfect pet? (He's not big or loud; he doesn't jump on furniture, scratch, or shed; and he doesn't eat much.)
- ? What is Doug? (a bug)
- ? What's a bug? (Answers will vary, but some students will say a bug is an insect.)

The Perfect Pet Anticipation Guide

Pass out *The Perfect Pet* Anticipation Guide. This set of pre- and post-questions can be used to activate and assess students' prior knowledge about bugs and other insects and uncover any misconceptions they may have. It can also motivate students to explore and read about insects to find out the answers to the questions. Have each student make their "best guess" to answer the before questions, then conduct a class discussion about the students' responses. Tell them that they will be learning the answers to those questions and more over the next several class periods. Collect the anticipation guides to find out what the students know or misunderstand about insects, and keep them until the Evaluate portion of the lesson. Students will fill out the after portion at that time.

Next tell students that they will be going on an expedition the following day to collect

some real live "perfect pets." They will be looking for invertebrates—small animals without backbones. Explain that a backbone is a column of bones along the center of an animal's back, also called a spine. Have students feel their own backbones. Explain that scientists sort all animals into two groups, those with backbones (vertebrates) and those without backbones (invertebrates). Insects, snails, pill bugs, spiders, and millipedes are examples of invertebrates.

Tell students they will be collecting only invertebrates that are small enough to fit in a clear Lucite "bug box" (show them a bug box). They will keep their pets long enough to draw pictures and make observations, then release the pets where they were found. Explain that although many people keep invertebrates as pets, it is important to know the needs and requirements of any animal before keeping it as a pet. That is why they will be letting the animals go instead of keeping them. They will be only temporary "pets"—kept just long enough to observe in the classroom.

Explore

Collect a "Pet" Invertebrate

In advance, locate a spot on the school grounds where students are likely to find a variety of invertebrates. Before going outside, discuss why it is important to treat all animals humanely, no matter how small they are. (See *Hey Little Ant* in *More Books to Read* for more on this topic.) Give each pair of students an aquarium net and a clear Lucite bug box. (You may want to pair up students who are apprehensive about catching invertebrates with those who aren't.)

Model how to use an aquarium net to gently capture an animal and then transfer it to a bug box without hurting it. You may want to take a large insect sweep net with you on the walk in case some students have trouble catching their pets. A sweep net is used either by sweeping the net back and forth rapidly in

SAFETY

1. Students should wear closed-toe shoes or sneakers, long pants, long-sleeve shirts, hats, sunglasses, sunscreen, and safety glasses or goggles.
2. Caution students against collecting ticks, mosquitoes, stinging insects, and other potentially hazardous insects.
3. Check with the school nurse regarding student medical issues (e.g., allergies to bee stings) and how to deal with them.
4. Find out whether outdoor areas have been treated with pesticides, fungicides, or any other toxins and avoid any such areas.
5. Caution students against poisonous plants such as poison ivy or poison sumac.
6. Bring some form of communication, such as a cell phone or two-way radio, in case of emergencies.
7. Inform parents, in writing, of the planned field trip, any potential hazards, and the safety precautions being taken.
8. Have students wash their hands with soap and water upon completing the activity.

the grass or by pulling the net through the grass while running. When finished, you can shake the invertebrates down to the bottom of the net so students can transfer them to their bug boxes. Caution students against trying to capture stinging or biting invertebrates, such as ticks, bees, or spiders, or animals that might be too large to fit safely into the box.

Remind students that after the animals are gently collected and carefully observed, they will be released where they were found and all rocks or logs will be returned to their original position. Then take the class outside to find their temporary “pets.” During the expedition, instruct students to walk quietly so they can listen for animal sounds: buzzing bees, chirping crickets, singing cicadas, and so on.

After each pair of students has collected a specimen, check to be sure the specimens are safe to work with (e.g., no ticks or bees). Then return to the classroom and have them place the bug boxes on their desks. Pass out the My “Pet” Invertebrate student page and have students begin observing, drawing, and describing their pets. Encourage students to add labels to their drawings. To get the best



OBSERVING AN INVERTEBRATE

close-up view of an invertebrate, hold a hand lens close to one eye and bring the animal in the bug box into focus. Students can use centimeter rulers to make approximate measurements of length.

Next have them write an inference about what they think their animal is and a list of questions they have about it. After they finish, have them look at some of the other specimens that were collected and make comparisons.

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Finally, go back outside and have students gently release the animals where they were found. Return to the classroom and discuss the drawings, observations, and questions on the My “Pet” Invertebrate page. Tell them that on the following day, they will learn more about some of the “pets” they have just observed.

Explain

Open Sort

Make several sets of the Invertebrate Sorting Cards. Place each set in an envelope. Have pairs or teams of students sort the cards into groups, any way they like (things that fly/don’t fly, legs/no legs, and so on). Walk around the room and ask students to justify how they sorted their cards. Tell them that they will get another chance to sort them after you read a nonfiction book aloud.

Determining Importance

Read the title, author, and illustrator and show the cover of *Bugs Are Insects*. Tell students that the information in this book might help them sort their cards, as well as answer some of the questions from *The Perfect Pet* Anticipation Guide. As you read the book, ask students to signal (“touch your ear”) when they hear an answer to the questions below, then stop to discuss each one:

- ? How many legs does an insect have? (six, page 7)
- ? An insect’s body is divided into three main parts. What are they? (head, thorax, and abdomen, page 14)
- ? Is a bug an insect? (Yes, explain that many people tend to call all insects bugs, but technically speaking, a “true bug” is a special kind of insect with a mouth like a beak and a head that forms a triangle, page 19.)



SORTING THE CARDS

- ? Is an insect an animal? (yes, page 30)

Explain that an insect is an animal because it can move on its own and gets food by eating other living or once-living things. Note that there are a few animals that can’t move from place to place, such as sponges and barnacles, but all animals need to eat other things for food. In contrast, a plant can’t move from place to place and makes its own food using sunlight. Sometimes people think only vertebrates (animals with backbones, such as mammals, fish, birds, reptiles, and amphibians) are animals, but invertebrates (animals without backbones) are animals too. Insects are invertebrates.

Then ask

- ? Are humans animals? Why? (Yes, they can move and they eat other living things.)
- ? Are humans vertebrates? Why? (Yes, they have backbones; have students feel their backbones.)

Closed Sort

Tell students that if they were to go just about anywhere on Earth and look for animals, most of the animals they would find would be insects. There are more kinds of insects than any other animal in the world! The study of

insects is called *entomology*. Have each pair or team re-sort their cards into two groups: insect and noninsect. Remind students to count the legs! Tell them that later they will learn how to use a key to identify all of the animals on the sorting cards. Answers are below:

INSECTS	NONINSECTS
B	A
C	D
E	H
F	I
G	L
J	
K	

After collecting the sorting cards for later use, generate a list on the board of the characteristics that adult insects have in common:

- Hard external skeleton (exoskeleton)
- Three main body parts (head, thorax, and abdomen)
- Six legs (attached to the thorax)
- Two pairs of wings, often
- One pair of antennae, often

Ask the following questions:

- Do all baby insects have these characteristics too? (not always)
- Can you think of a baby insect that doesn't share all of these characteristics? (e.g., caterpillars, mealworm larvae, etc.)

Explain that baby insects sometimes look very different from their parents, sometimes don't have three distinct body parts (caterpillars, for example), and sometimes have more than six legs. However, all adult insects have an exoskeleton, head, thorax, abdomen, and at least six legs. Note that some insects, such



LABELING INSECT STRUCTURES

as fleas and ants, have no wings; flies have only one pair of wings.

Then describe a “structure” as a body part and how all animals have specialized structures to help them survive in their environment. Make a simple drawing of an insect on the board, and have the class help label the structures (see Figure 21.2, p. 309). With input from the class, make a T-chart like the one below and discuss the various functions of insect structures.

Next ask the students

- ? Why do you think the book we read is called *Bugs Are Insects*? (Bugs are a type of insect.)

Sample T-Chart

Insect Structures	Functions
Exoskeleton	Support, protection, camouflage, warning coloration
Legs	Jumping, paddling, carrying pollen, making sound, grooming, catching prey
Mouth	Sucking, piercing, biting, chewing
Antennae	Sensing
Wings	Flying

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- ? Could it be called “Insects Are Bugs”? (No, not all insects are bugs.)
- ? What makes a bug a bug? (A “true bug” is an insect with a mouth like a beak and a head that forms a triangle.)

Add that many true bugs also have wings that overlap and fold flat over their bodies, forming a triangle shape on their backs. Beetles, on the other hand, have wings that make a straight line down their backs when closed.

Elaborate

Invertebrate Dichotomous Key

Tell students there are millions of different kinds of invertebrates in the world. They may wonder how scientists keep track of them all. Introduce a dichotomous key as a special tool that scientists use to identify things in nature. These keys are most often used for identifying things in nature, such as trees, flowers, seashells, or animals. Pass out the Invertebrate Dichotomous Key. Explain that the word *dichotomous* means to divide into two parts. A dichotomous key is a series of statements about an organism’s characteristics. It has two choices at every step. You keep following the key, deciding between the two choices at each step, until you can identify the organism being studied.

Tell students they will use the key to identify the animals on the invertebrate cards that they sorted earlier. Pass out the envelopes containing the Invertebrate Sorting Cards. Groups of students can share card sets, but students should work in pairs or on their own. Tell students that this key will work only for the animals pictured on the cards. Direct students to the diagram of the insect at the top of the page, and tell them that they can refer to the diagram to help them use the key. Then model how to use the key using Invertebrate A (the easiest one to identify!). Tell them to always start at number 1 and always read both choices

at each step (even if the first choice seems to be a logical answer). Talk through each step of the key together, until they are able to identify Invertebrate A as an earthworm. Then have students use the key to identify the remaining invertebrates and write their answers at the bottom of the key. Correct answers are below:

A. Earthworm	G. True bug
B. True fly	H. Scorpion
C. Dragonfly	I. Centipede
D. Spider	J. Wasp
E. Silverfish	K. Earwig
F. Beetle	L. Tick

Next show the class some pictures of Doug the “bug” from *The Perfect Pet*. Ask

- ? Do you think Doug is really a bug? Why or why not? (No, he is a beetle, because it looks like his wings meet in the center of his back, forming a straight line.)

Evaluate

My “Pet” Invertebrate

Next have students revisit their My “Pet” Invertebrate student pages and think about the animals they collected for observation. Ask

- ? Was it an insect? (Answers will vary.)
- ? Why or why not? (All insects have six legs.)
- ? If it was an insect, was it a beetle? Was it a bug? How do you know? (Beetles have a straight line down their backs where their wings meet. Bugs have a triangular shape on their backs where their wings overlap.)

Anticipation Guide (After)

Then have students fill out the after column on *The Perfect Pet* Anticipation Guide. Col-

lect the anticipation guides to assess your students' progress and determine if they have any remaining misconceptions about insects. Answers are

- 1 six
- 2 head, thorax, abdomen labeled correctly
- 3 yes
- 4 yes, because they can move and they eat other living things

Ant, Ant, Ant! (An Insect Chant)

Before reading this book aloud, you may want to practice! Introduce the author and illustrator of *Ant, Ant, Ant! (An Insect Chant)*. Tell students that April Pulley Sayre wrote the book because she likes learning about all kinds of animals, and she really likes to make up chants. A chant is a rhythmic speaking or singing of words or sounds. The artist, Trip Park, wanted to make the illustrations interesting and humorous. As a result, the pictures in the book may not be quite true to life. As you read, have students look for any insect structures or behaviors that are not drawn accurately. Read the book a little slowly the first time through, so students have a chance to study the illustrations. After reading, ask

- ? Did you notice any insect structures that are not scientifically accurate? (The two-spotted stinkbug has a nose; the cockroach and slug caterpillar have teeth and tongues; the dragonfly has lips; the chrysalis has a zipper; and so on.)
- ? Did you notice any insect behaviors that were not scientifically accurate? (The ant is changing the firefly's bulb; the conehead is holding toilet paper for the dung beetle who is reading a book; the thrip is water-skiing; and so on.)
- ? What things in the book ARE scientifically accurate? (All of the adult insects have six legs; all of the insect names are real insect names; the insects have antennae; the ear-



AUTHOR APRIL PULLEY SAYRE READING ALOUD

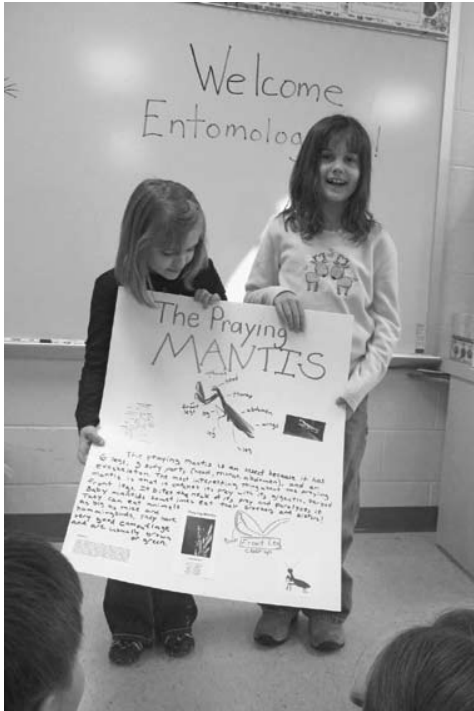
wig has pincers; the butterflies' wings look realistic; and so on.)

Finally, ask students to recall their favorite insects from the book as you read it aloud a second time (only faster!). The faster you read it, the more fun it is. More information about each insect is located at the back of the book. Tell students that they are going to have a chance to learn a lot more about their favorite insects!

Entomology Convention

Announce to the class that you are going to have an "Entomology Convention," where the students will present poster projects on insects. Explain that entomologists really do meet this way to share poster projects. For example, each year the Entomological Society of America has a four-day event when thousands of entomologists and professionals from related fields gather from around the world

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PRESENTING AT AN ENTOMOLOGY CONVENTION

to exchange scientific information and ideas through poster presentations, workshops, and discussions (see www.entsoc.org). Entomologists also gather every four years to share scientific posters at the International Congress of Entomology (see www.ice2008.org.za). Tell students they may choose any insect they wish for their poster. They may want to research an insect they found during the Collect a

“Pet” Invertebrate walk, an insect featured in *Ant! Ant! Ant! (An Insect Chant)*, or any other

insect that interests them. Remind students that there are more kinds of insects on Earth than kinds of any other animal, so they have a lot of choices!

Provide a variety of resources for students to use in their research, such as nonfiction books, insect guides such as the *Peterson First Guide to Insects of North America* (see More Books to Read), and websites. You may want to invite experts such as entomologists, biologists, agriculturalists, park naturalists, beekeepers, hobbyists, or even exterminators to talk to your class about insects. Once students have chosen their insects for study, have them use the Insect Poster Rubric as a guide for their projects. Some students may choose to build three-dimensional models of their insects instead of drawing them. When the projects are finished, invite other classrooms to the convention. Have students stationed at their posters to discuss them with visitors. You may want to have visiting students jot down questions or comments on cards or sticky notes to leave at each poster. Evaluate the projects using the Insect Poster Rubric.

Inquiry Place

Have students brainstorm questions about insects, such as

- ? Which invertebrates are more common in your school yard, insects or noninsects? Count and compare!
- ? Do pill bugs prefer light or dark? Damp or dry? Test it!
- ? Does your state have an official state insect? Research it!
- ? How do honeybees, ants, or other insects communicate with one another? Research it!

Then have students select a question to investigate, or have groups of students vote on the question they want to investigate as a team. Students can present their findings at a poster session or gallery walk.

Websites

The Bug Club

www.amentsoc.org/bug-club

The Amateur Entomologists' Society is the UK's leading organization for people interested in insects. The AES website includes the Bug Club for kids, which offers caresheets for keeping insects as well as a fun and games section.

Bugbios

www.insects.org

This website dedicated to the "shameless promotion of insect appreciation" includes a collection of stunning insect photography combined with informative descriptions.

Bugwise: All About Invertebrates

www.bugwise.net/invertebrates

This website from the Australian Museum includes an excellent guide to invertebrates.

University of Kentucky Entomology for Kids and Teachers

www.ca.uky.edu/entomology/dept/youth.asp

This website includes information on common insects, as well as a section on edible insects and links to the "Wee Beasties" entomology newsletter.

More Books to Read

Aloian, M., and B. Kalman. 2005. *Insect life cycles*. New York: Crabtree.

Summary: This nonfiction book explores the life cycles of a variety of insects in an engaging, fact-filled format. It includes full-color photographs, table of contents, bold-print words, captions, and a glossary.

Florian, D. 2002. *Insectlopedia*. Orlando, FL: Voyager Books.

Summary: Contains 21 delightful poems about insects such as crickets, termites, and mayflies.

Watercolor collage illustrations are the perfect complements to Florian's whimsical poems.

Froman, N. 2009. *What's that bug? Everyday insects and their really cool cousins*. Toronto: Madison Press Books.

Summary: Large, bright, detailed paintings will attract readers to this overview of nine selected insect orders. Within each order, several common and exotic species are highlighted, including scientific names and a brief overview of major characteristics.

Hoose, P., and H. Hoose. *Hey little ant*. 2004. Berkeley, CA: Tricycle Press.

Summary: In 1992, Phillip Hoose and his daughter Hannah, then nine, wrote a musical conversation between an ant about to get flattened and the child about to squish it. It ended with the question "What do you think that kid should do?" Their popular recording of the song "Hey Little Ant" led to the story's publication as a children's picture book. Illustrated with brightly colored cartoons by Debbie Tilley, the book's message is clear: Respect all creatures and their right to live.

Leahy, C. 1998. *Peterson first guide to insects of North America*. New York: Houghton Mifflin Harcourt.

Summary: This condensed version of the famous *Peterson Field Guide* makes insect identification simple for beginning naturalists.

Parker, N. W., and J. R. Wright. 1988. *Bugs*. New York: Greenwillow Books.

Summary: Twelve insects and four other invertebrates are described in lively couplets, illustrations, and diagrams. Although the term "bug" is loosely applied to all invertebrates in the couplets, the diagrams and descriptions on the right-hand pages are detailed and scientifically accurate.

Name: _____

The Perfect Pet

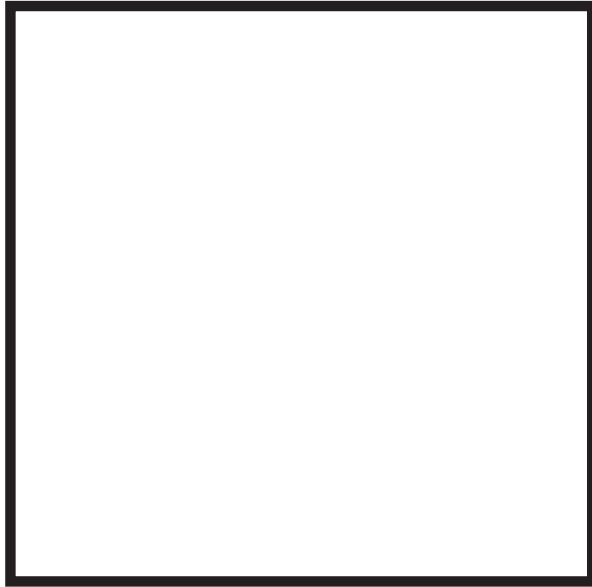
Anticipation Guide

In the book *The Perfect Pet*, Elizabeth thinks “Doug the bug” is the perfect pet. Show what you know about bugs by filling in the BEFORE chart below. Later, you will fill out the AFTER chart.

Before

1 How many legs does an insect have? _____

2 Draw an insect and label its three main body parts in the space below.



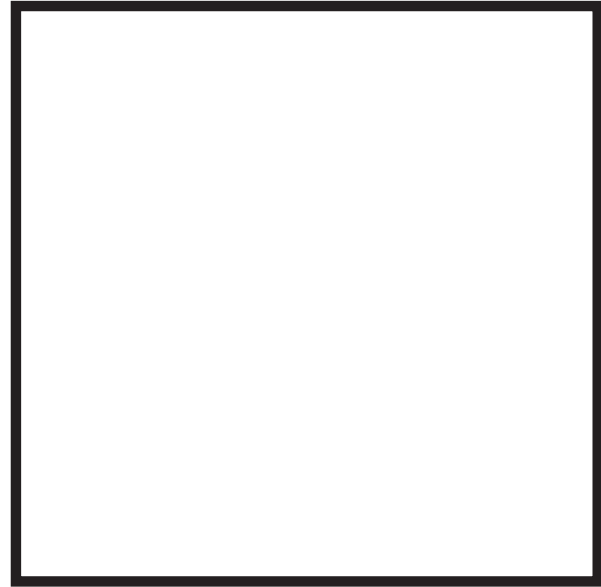
3 Is a bug an insect? _____

4 Is an insect an animal? Why or why not?

After

1 How many legs does an insect have? _____

2 Draw an insect and label its three main body parts in the space below.



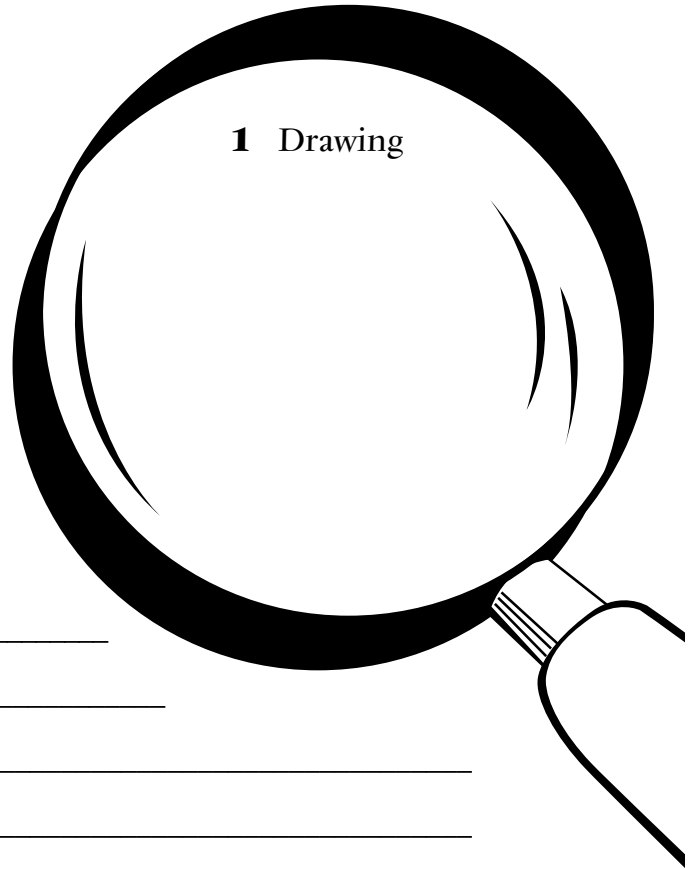
3 Is a bug an insect? _____

4 Is an insect an animal? Why or why not?

Name: _____

1 Drawing

My “Pet” Invertebrate



2 This is what my pet looks like: _____

3 This is where I found my pet: _____

4 My pet has _____ legs.

5 My pet has _____ wings.

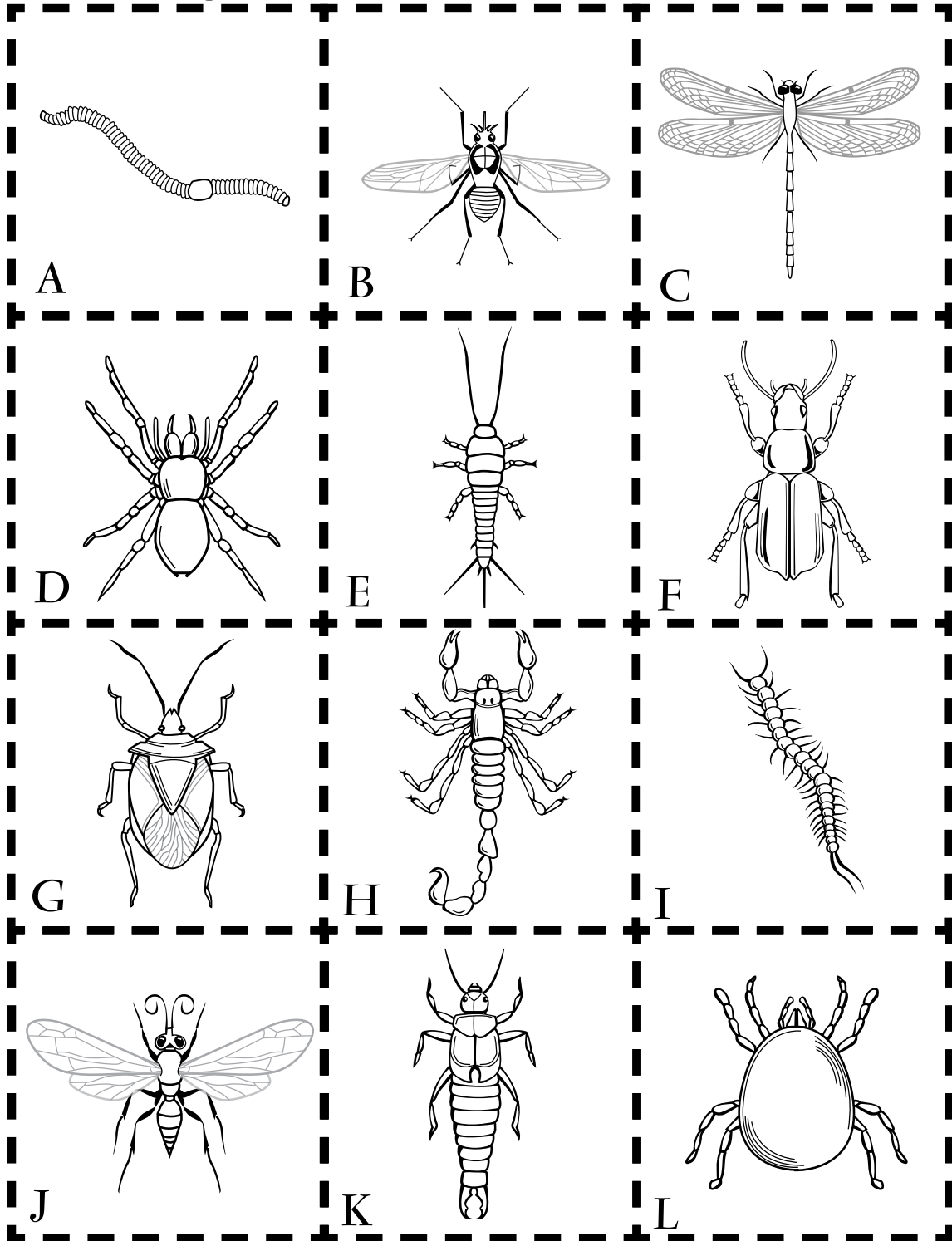
6 My pet is about _____ cm long.

7 I think my pet is a _____.

8 This is what I am wondering about my pet: _____

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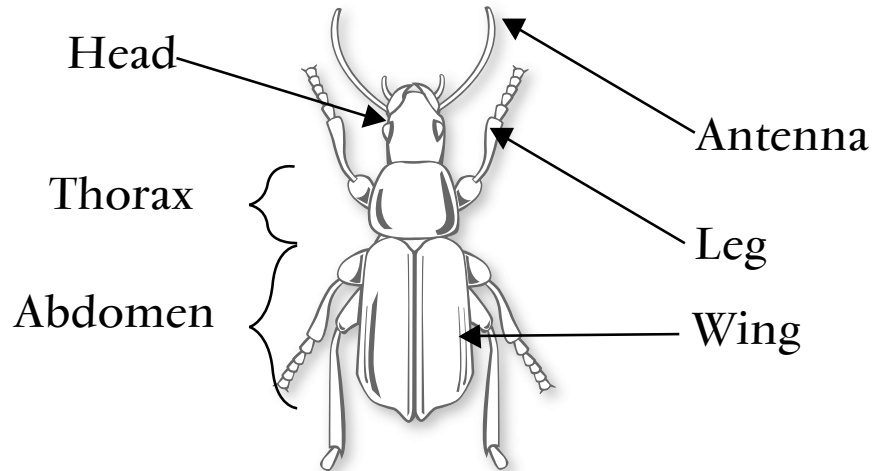
Invertebrate Sorting Cards



ILLUSTRATIONS BY LINDA OLLIVER

Name: _____

Invertebrate Dichotomous Key



Insect

Directions: Starting with the picture of Invertebrate A, use the key below to identify each invertebrate. Write the name of each invertebrate on the answer sheet. *Remember to go back to #1 on the key each time you start with a new invertebrate!*

- 1** Insect (6 legs)go to 2
Noninsect (more or less than 6 legs)go to 8
- 2** Wings are held out from body.....go to 3
Wings are absent or held close to body.....go to 5
- 3** One pair of wings.....TRUE FLY
Two pairs of wings.....go to 4
- 4** Front and hind wings similar in shape and size.....DRAGONFLY
Front and hind wings not similar in shape and size.....WASP
- 5** Wings cover abdomen.....go to 6
Wings are absent or do not cover abdomen.....go to 7

Name: _____

Invertebrate

Dichotomous Key cont.

- 6** Wings meet to form straight line down back..... BEETLE
 Wings overlap to form triangle shape on back TRUE BUG
- 7** Sharp pincers at tip of abdomen.....EARWIG
 Three threadlike tails at tip of abdomen.....SILVERFISH
- 8** No legs EARTHWORM
 Legs go to 9
- 9** Eight legs go to 10
 More than eight legs..... CENTIPEDE
- 10** Tail.....SCORPION
 No tail go to 11
- 11** Body looks like it is separated into two partsSPIDER
 Body looks like it is one part..... TICK

Answers

A.	G.
B.	H.
C.	I.
D.	J.
E.	K.
F.	L.

Name: _____

Insect Poster Rubric

Common Name of Insect: _____

4 Points: At least four fascinating facts about your insect

4 3 2 1 0

3 Points: A large, detailed, full-color drawing or 3-D model of your insect, with the head, thorax, and abdomen labeled

3 2 1 0

2 Points: A close-up photo or drawing of one of your insect's most interesting structures and a description of what the structure does

2 1 0

1 Point: An explanation of why your insect is classified as an insect

1 0

Extra Credit: A poem, song, rap, cheer, or chant about your insect

1 0

Total Points _____ /10

Comments: _____