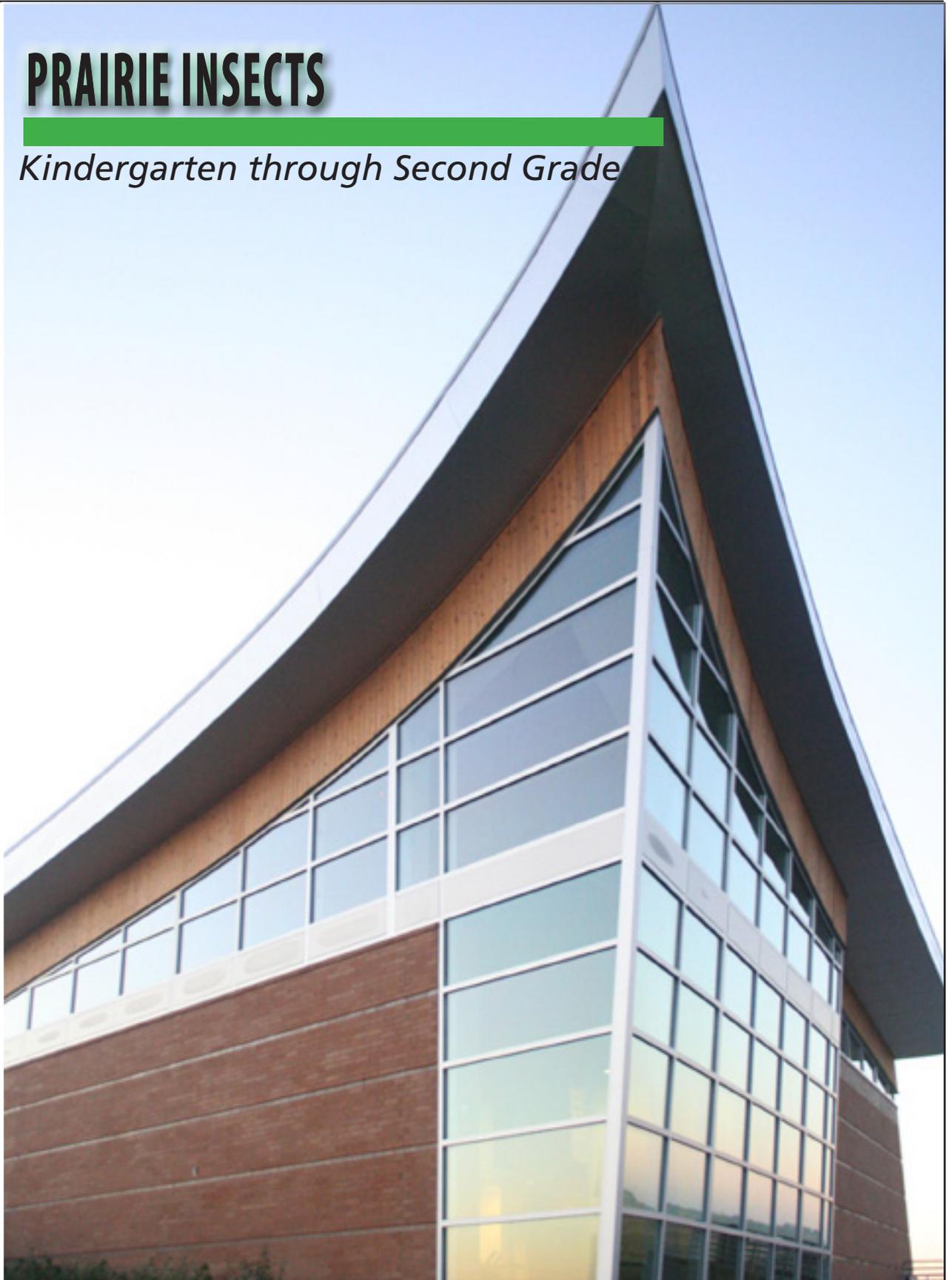


Free Land was the Cry!

PRAIRIE INSECTS

Kindergarten through Second Grade



Homestead

National Park Service
U.S. Department of the Interior

Homestead National Monument
of America, Nebraska



ACKNOWLEDGEMENTS

Coordinator

Tina Miller, Education Coordinator,
Homestead National Monument of America

Teacher Ranger Teachers

Craig Rafert, Social Studies Teacher at Sutton, NE
Ellen Janssen, Fourth Grade Teacher at Beatrice, NE

Layout Artist

Doris Martin, Seasonal Park Guide
Homestead National Monument of America

Primary Author

Connie Leech, Second Grade Teacher at Beatrice, NE

Interns

Sasha Denton, History major at Doane College
Andy Fuxa, Communications major at Nebraska Wesleyan University
Leah Goossen, Art major at the University of Nebraska-Lincoln

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Merrith Baughman, Chief of Interpretation and Resource Management,
Homestead National Monument of America
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Tricia Parker, Reading/Writing Director, Nebraska Department of Education
Deb Romanek, Mathematics Director, Nebraska Department of Education
Vicki Scow, World Language Education, Nebraska Department of Education
Summer Stephens, Director of Curriculum and Assessment, Beatrice Public Schools
Larry Starr, Director of Social Studies, Nebraska Department of Education
Jim Woodland, Director of Science, Nebraska Department of Education



TABLE OF CONTENTS

This unit has Pre-Visit Activities for teachers to use to prepare students for a visit to Homestead National Monument of America, a Ranger-Led Experience which will occur during your visit, and Post-Visit Activities for teachers to use to expand students' knowledge of the impact the Homestead Act of 1862 had on America.

Program Description	Page 4
Curriculum Objectives, National Standards	Page 5
Pre-Visit Activity #1: Classifying Animals	
With or Without a Backbone	Pages 6-11
Ranger Led Experience	Pages 12, 13
Post-Visit Activity #1: Insect Anatomy.....	Pages 14, 15
Character Education	Page 16
Additional Resources including Homestead Handouts	Pages 17-25

Some of the ideas in this lesson may have been adapted from earlier, unacknowledged sources without our knowledge. If the reader believes this to be the case, please let us know, and appropriate corrections will be made. Thank you.

PROGRAM DESCRIPTION



‘The Monument’s natural resources are managed in such a way as to maintain a heterogeneous landscape composed of a mosaic of high quality remnant and restored tallgrass prairie, lowland bur oak forest and associated ecotones, as well as prairie streams and their hydrologic processes; that reflect the value of the site as a homestead, represents as accurately as possible the environment encountered by early settlers, and preserves native biodiversity.’

Desired Future Condition of the Natural Resources of Homestead National Monument of America

Homestead National Monument of America’s tallgrass prairie is managed so that visitors can experience an environment similar to the one experienced by homesteaders. An important element in the biodiversity of the tallgrass prairie is insects.

The homesteaders encountered insects often in their everyday life. Ants and grain beetles could infest their grain and staple food supplies. Wasps could sting vi-

ciously and if one was allergic to their sting, death would follow as they had no antidotes to the venom. Fleas carried deadly diseases such as plagues. Bed bugs, lice, chiggers and mosquitos also made life uncomfortable.

Homesteaders often had to treat animals for the New World Screwworm, a type of blow fly that would infest wounds of living animals, including humans. Clothes moths would eat holes in wool and cotton clothing. Butterflies, although not problematic, were prevalent in the prairies as well. Even though insects were a challenge for the homesteaders they are important to maintaining a healthy prairie.

Insects perform a vast number of important functions. They aerate the soil, pollinate blossoms, and control insect and plant pests; they also decompose dead materials, thereby reintroducing nutrients into the soil. Burrowing bugs such as ants and beetles dig tunnels that provide channels for water, benefiting plants. Bees play a major role in pollinating fruit trees and flower blossoms. Gardeners love the big-eyed bug and praying mantis because they control the size of certain insect populations, such as aphids and caterpillars, which feed on new plant growth. Finally, all insects fertilize the soil with the nutrients from their droppings.

CURRICULUM OBJECTIVES

- Students will be able to identify which prairie invertebrates are insects.
- Students will be able to identify the parts of an insect.
- Students will learn about the characteristics of insects.

NATIONAL STANDARDS

NS.K-4.1 SCIENCE AS INQUIRY

As a result of activities in grades K-4, all students should develop

- Abilities necessary to do scientific inquiry
- Understanding about scientific inquiry.

NS.K-4.3 LIFE SCIENCE

As a result of activities in grades K-4, all students should develop understanding of

- The characteristics of organisms
- Life cycles of organisms
- Organisms and environments.

SPECIAL ICONS	 <p>Homestead Handout</p>	 <p><i>Enrichment Activities</i></p>	 <p>Math</p>	 <p>Science</p>	 <p><i>Did you know?</i></p>	 <p>Cool Internet Sites:</p>
	Indicates a reproducible handout is included	Indicates advanced lessons	Indicates an additional math lesson	Indicates an additional science activity	Indicates a little known fact about the subject	Indicates a listing of interesting websites

Pre-Visit Activity #1 (suggested)

CLASSIFYING ANIMALS

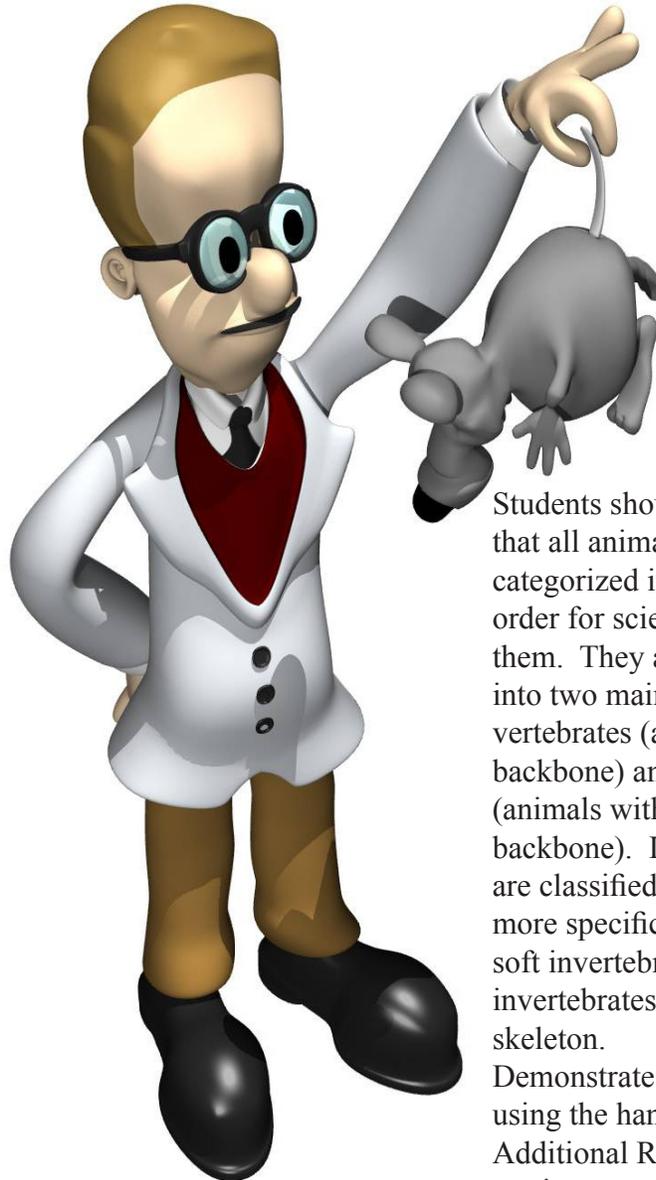
Did you know?



Houseflies find sugar with their feet, which are 10 million times more sensitive than human tongues.



Ants can lift and carry more than fifty times their own weight.



Students should understand that all animals are categorized into groups in order for scientists to study them. They are classified into two main groups called vertebrates (animals with a backbone) and invertebrates (animals without a backbone). Invertebrates are classified into two more specific groups called soft invertebrates and invertebrates with an outer skeleton.

Demonstrate these groups using the handouts in the Additional Resources section.

Other Activities

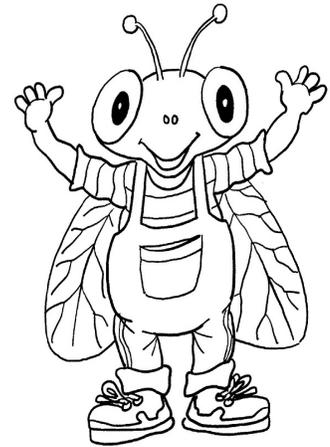
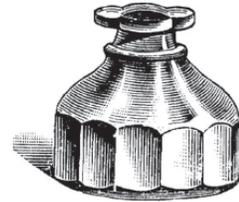
Have your students collect a variety of invertebrates during their recesses with nets. Put these creatures in jars for your classroom to investigate.



WITH OR WITHOUT A BACKBONE

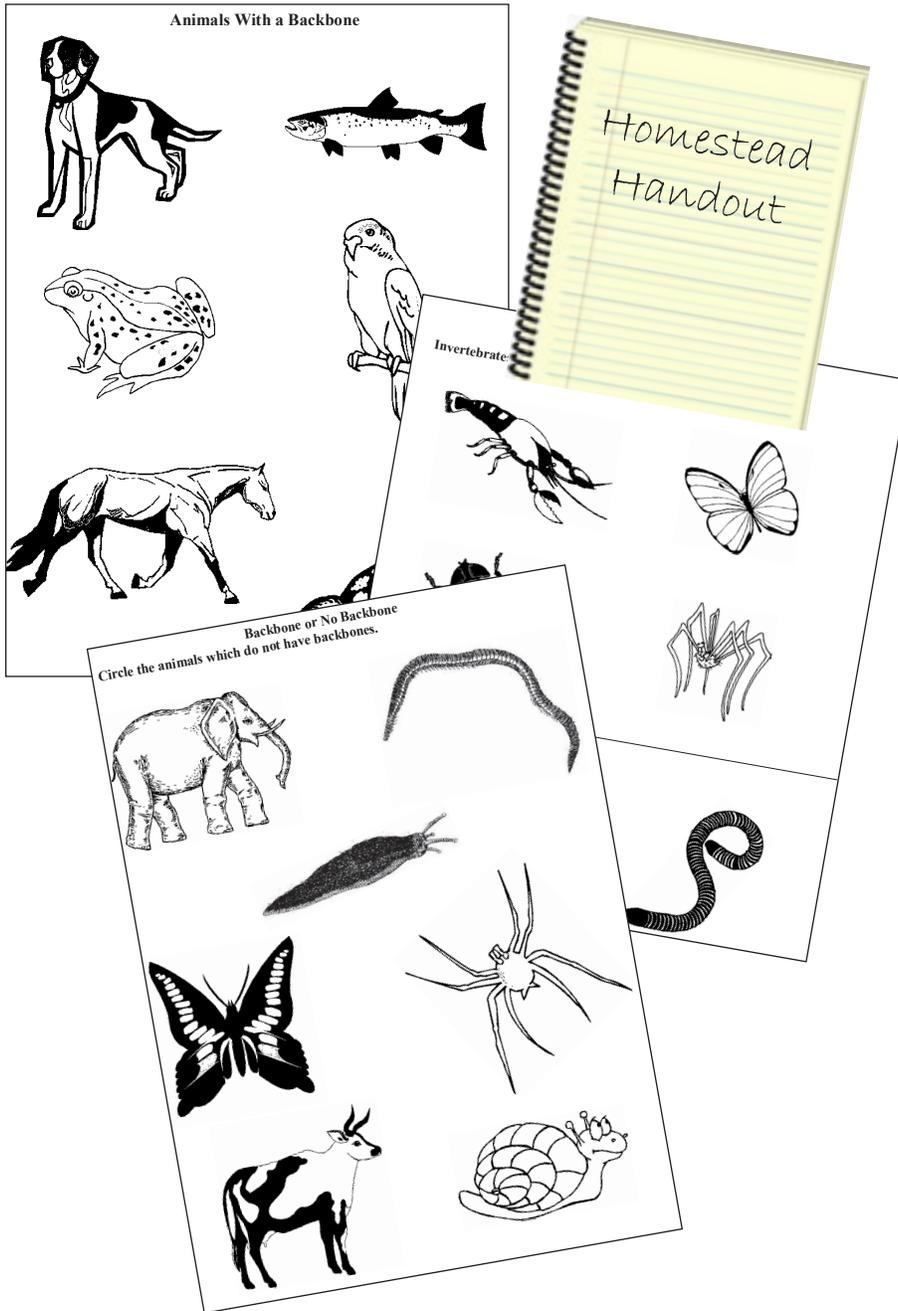
Pre-Visit Activity #1 (suggested)

Enrichment Activities



Write and illustrate a short story about an insect. Have an insect be the main character.

Animals With a Backbone



Invertebrate

Circle the animals which do not have backbones.

Homestead Handout

Each national park site has its own special story to tell. Homestead National Monument of America's story is about homesteading, but there are other sites to visit which will increase your understanding of insects. Everglades National Park, the largest subtropical wilderness in the United States, boasts rare and endangered species. It has been designated a World Heritage Site, International Biosphere Reserve, and Wetland of International Importance, significant to all people of the world. Visit www.nps.gov/ever for more information.



Pre-Visit Activity #1 (suggested)

CLASSIFYING ANIMALS

Invertebrates Animals Without Backbones

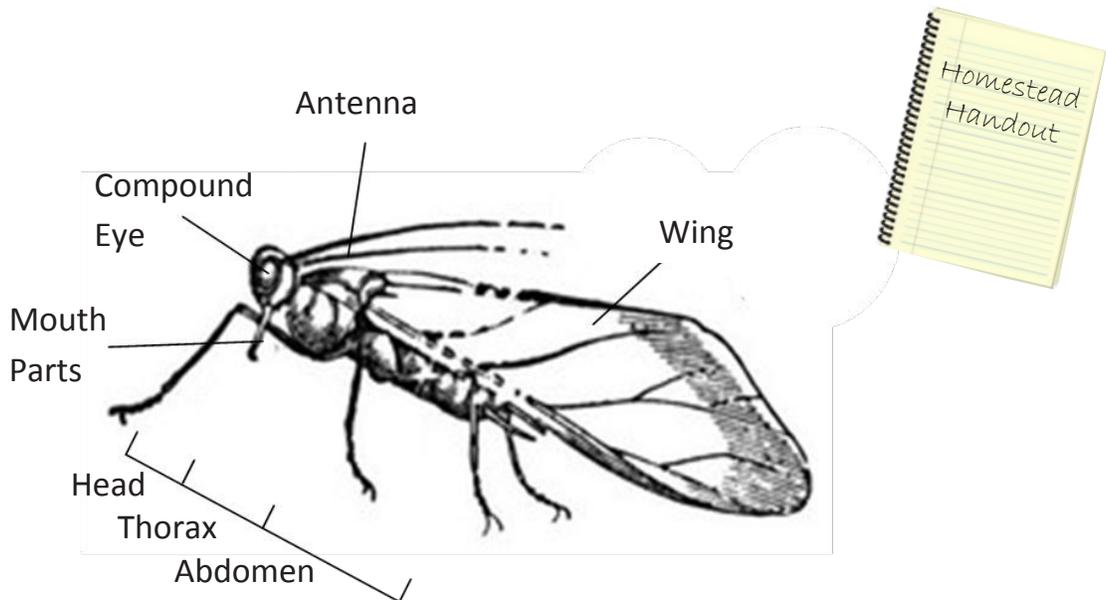
When we think of animals, we usually think of dogs, cats, birds, or even horses. These animals are vertebrates, or animals with a backbone.

Most of our world's animals do not have a backbone. They are called invertebrates. Some have an outside skeleton, and some have no skeleton at all.

Learn about the four types of invertebrates: insects, spiders, worms, and snails.

Insects

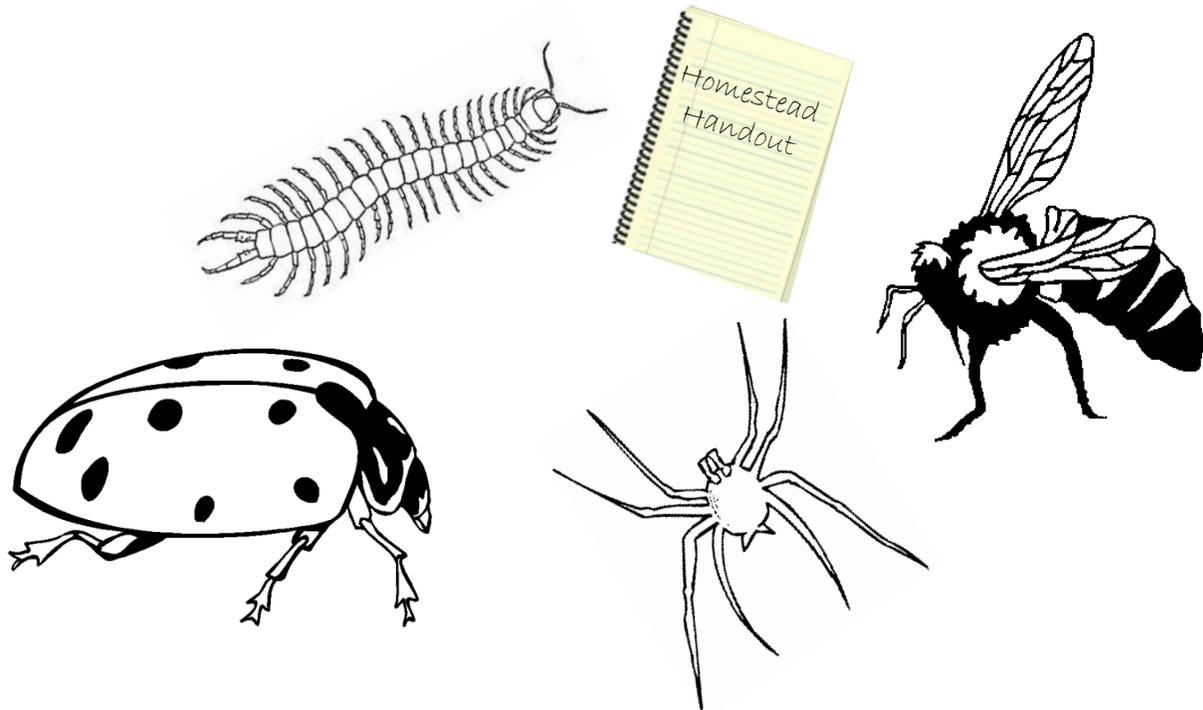
Insects don't have backbones. They have an exoskeleton on the outside. There are many different kinds of insects. They can be different in color, size, shape, the way they move, the noises they make, etc. However, they are all alike in certain ways. Insects have three body parts: head, thorax (chest), and abdomen (stomach). They have six legs which are connected at the thorax. There are three legs on each side. They have two compound eyes and two antennae connected to their head. Most insects have two or four wings. They have mouth parts.



WITH OR WITHOUT A BACKBONE

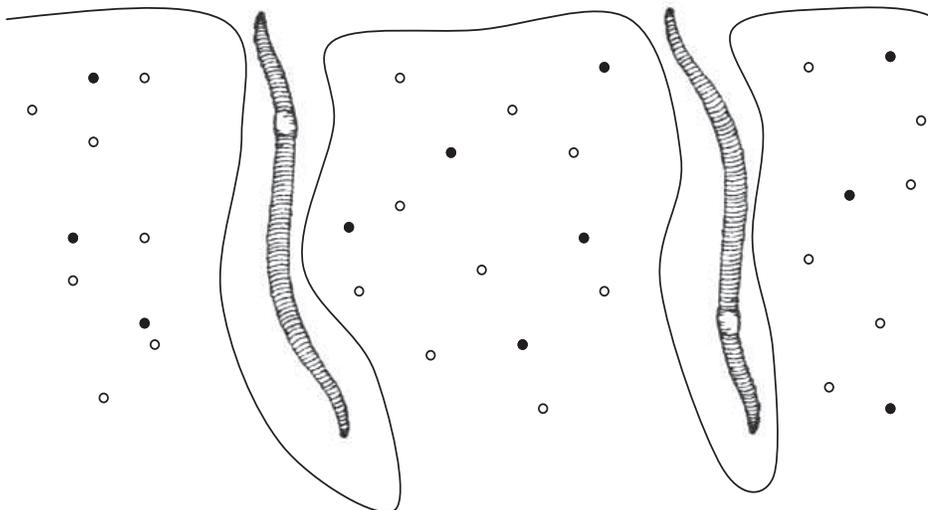
Pre-Visit Activity #1 (suggested)

Think about what you have learned and color the insects on this page.



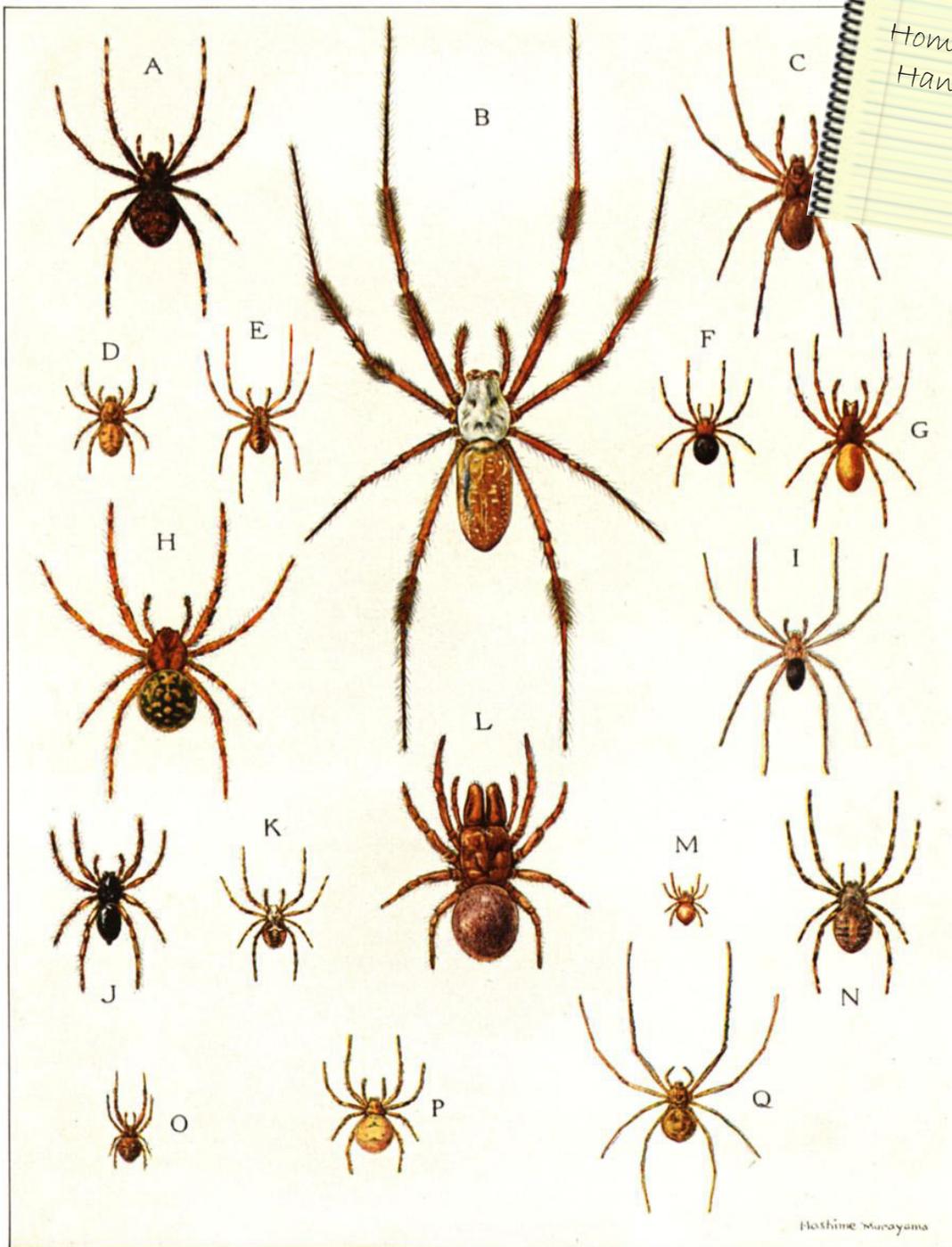
Worms

Earthworms are invertebrates, also. They have no skeleton. They have long, soft bodies. Their bodies have many parts called **segments**. Earthworms do not have legs, eyes, ears, or noses. They can feel vibrations of the ground and heat.



**Pre-Visit
Activity #1
(suggested)**

CLASSIFYING ANIMALS



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Natural size

FABRICS OF MANY DESIGNS COME FROM THESE ASSORTED SPINNERS' LOOMS

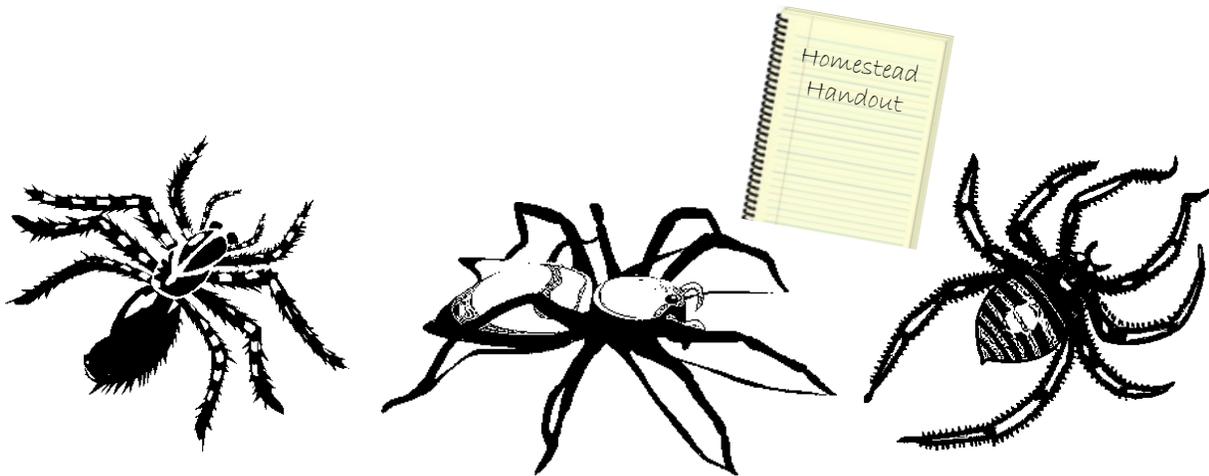
A, *Araneus benjaminus*, H, *Araneus trifolium*, K, *Araneus labyrinthus*, N, *Araneus vulgaris*, and P, *Araneus thaddeus*, make typical orb webs. B, *Nephila clavipes*, is a silk spider. C, *Filistata hibernalis*, D, *Amaurobius bennetti*, M, *Hyptiotes cavatus*, and O, *Uloborus americanus*, are hackle-band weavers. E, *Linyphia phrygiana*, spins a sheet. F, *Steatoda borealis*, produces mere cobwebs, and L, *Atypus abbotii*, fashions a tube. G, *Dysdera crocata*, I, *Loxosceles rufescens*, and Q, *Scytodes longipes*, have six eyes. J, *Zelotes ater*, is a drassid, moss spider (see pages 214, 218, 219, 224, 225).

WITH OR WITHOUT A BACKBONE

Pre-Visit Activity #1 (suggested)

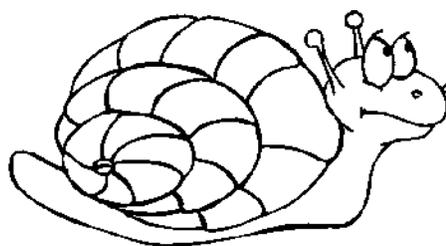
Spiders

Spiders are another type of invertebrate. There are many different types of spiders. They can be many different colors, sizes, and shapes. However, spiders are alike in many ways. They have a hard outer skeleton called an exoskeleton. They all have two body parts (cephalothorax and abdomen). They have 8 legs. Most spiders have 8 eyes with two main ones. Most spiders spin silk to make webs. The silk comes out of spinnerets in the spider's abdomen.



Snails

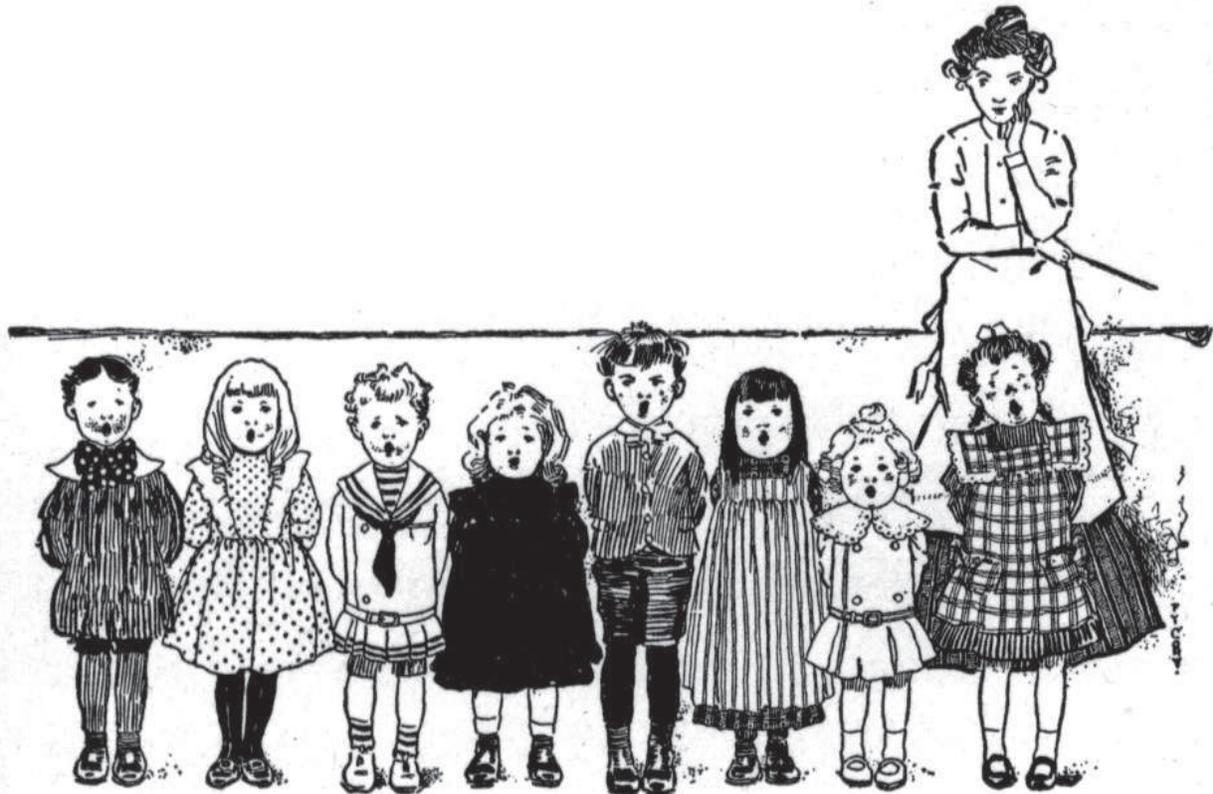
The last type of invertebrate we will learn about is the snail. They have soft bodies. They have one foot which they slide along on after squirting out a slimy trail. Snails have a head with two pairs of feelers on it. The top longer pair of feelers have eyes in them. The snail can put them up to look around or pull them back to the head when it senses danger. The other shorter pair are for feeling and smelling. A snail can pull its body into its shell for protection. It has rows of tiny teeth on its tongue. In order to eat, the snail scrapes its tongue on vegetation and then swallows what it gets.



RANGER-LED EXPERIENCE

Activity 1

The park ranger will begin by asking everyone to get into one large circle and sing the following song. It is sung to the tune of, “Head, Shoulders, Knees, and Toes.” Everyone should be encouraged to touch where the body parts would be on them as they sing the song.



“Head, Thorax, Abdomen”

Head, thorax, abdomen, abdomen (Wiggle your abdomen as you say it the second time.)

Head, thorax, abdomen, abdomen (Wiggle your abdomen as you say it the second time.)

Two antennae, six legs, and four wings

Head, thorax, abdomen, abdomen

Two compound eyes, and a mouth but no nose

Head, thorax, abdomen, abdomen

Head, thorax, abdomen, abdomen

Head, thorax, abdomen, abdomen

RANGER-LED EXPERIENCE

Activity 2



Teachers should divide the students into groups of approximately ten, with at least one adult per group. They will walk the trails looking for various animals. They should take along bug containers which magnify or containers and magnifying glasses. As the groups walk, they should capture and investigate each creature they catch. They should discuss the following questions:

- Is it an insect? Why or why not?
- What are its body parts?
- Where did we find it?
- Why do you think it was there?
- What do you think it eats?
- What are some of its predators?
- How do you think it defends itself?
- Does anyone know the life cycle of this invertebrate?

As they finish discussing each creature, let them go. Have one student be a recorder and write down the names of all the animals they see. Record how many were insects. Recommended time for this activity is 1 hour.

Activity 3

Last, have all the groups meet back together and sit in a big circle to discuss what they discovered on their walks. Have the recorder from each group read aloud all the different insects that they found. See if students can tell names of other insects which live in your state that they didn't find. Some examples which are frequently found are:

- | | |
|---------------------------|-----------------------------|
| • Ants | • Flies |
| • Ant lions (doodle bugs) | • Gnats |
| • Bees | • Head lice |
| • Beetles | • Mites (includes chiggers) |
| • Butterflies | • Mosquitoes |
| • Cockroaches | • Moths |
| • Crickets | • Termites |
| • Fleas | • Wasps |



Homestead National Monument of America is proud to be a pioneer in distance learning technology.

Contact the Education Coordinator at (402) 223-3514 to schedule your virtual field trip on Prairie Insects.

Post-Visit Activity #1 (suggested)

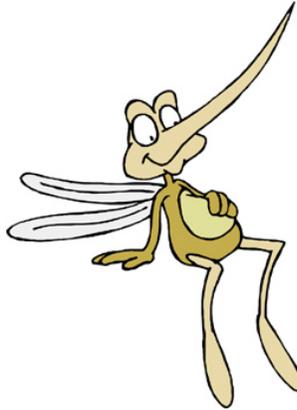


1. Insects are small animals with six legs. Insects use their legs to run, walk, jump, dig, and even sing!
2. There are approximately five million different kinds of insects in the world.
3. Insects wear their skeletons on the outside of their bodies. This exoskeleton protects an insect's body like a suit of armor.
4. An insect has a heart, a brain, a tummy, air sacs, and nerves. These organs don't look like human organs, but they function in similar ways.
5. All insects are cold-blooded. Sometimes big bugs shiver before they fly. What they are really doing is warming up their flight muscles so they'll work!

(continued on page 15)

INSECT ANATOMY

Mouth Parts



Ask students to imagine they are an insect. It is getting late and they have not had anything to eat all day long. If there was a table full of human food in front of you, how do you think you would eat it?

All insects do not eat the same way, just like a baby and a big person do not eat the same way. A baby does not have teeth. How does a baby eat their food? How does an adult eat their food?

Not all insects eat the same things either.

- Some insects chew food. (leaves, grass, etc.)
- Some eat mushy food. (vomit, decaying garbage, etc.)
- Some suck their food. (blood, drinks, water, etc.)

On a table, the teacher has the following food items: fruit roll-ups, M&Ms, red Jell-O, juice box, and apple sauce.

The following utensils are used as mouth parts: pliers, syringe, straw, sponge.

The children are shown the various utensils and they are allowed to pick the insect they wish to be.

- Pliers: caterpillars, grasshoppers, ants and praying mantis
- Syringe: mosquito
- Straw: bees and butterflies
- Sponge: fly

The children are given an opportunity to try to eat the various food items with the utensils provided. At the end of the lesson, the children will explain the problems they encountered eating their food.

Other Activities



Click here to see amazing, close-up images of bug bodies:

<http://bit.ly/cMDRit>

Explore Life as a Bug at this site:

<http://bit.ly/9x9DpN>

INSECT ANATOMY

Post-Visit Activity #1 (suggested)

Insect Anatomy

Have students do the following activities to learn more about insect anatomy.



(continued from page 14)

Activity 1

Complete a chart with your students comparing the number of people parts to insect parts, or the number of spider parts compared to insect parts. See the example in the Additional Resources.

Activity 2

After reviewing the insect body parts have students complete either the Insect Anatomy worksheet or Insect Parts worksheet.

Activity 3

Provide students with Sculpy Clay and have them create their own insect which includes all the body parts.

Activity 4

Using the Insect Development worksheet and other books or posters discuss the three different types of insect development. You may complete the Insect Development worksheet as a whole group.



6. Most insects have short lives. Some adult insects only live a few hours!

7. Insects do not have noses; they smell with their antennae, or feelers.

8. Insects can see, smell, and hear some things that humans cannot.

9. Scientists are not sure what insects can feel.

10. Insects communicate with each other in a variety of ways. Some insects flash lights, sing, dance, or use smelly chemicals to signal each other.



Explore an interactive beehive here:

<http://to.pbs.org/9AcREC>

Find out more about the life of a honey bee:

<http://bit.ly/9qJYVE>

Other Activities

CHARACTER EDUCATION

CARING

Caring students help, give, love, and are kind. You can tell a person is caring by what she or he does. They are caretakers of people, pets, plants, possessions and our planet, Earth.

5 Minute Focus

Honey bees are very important. They are pollinators, which mean they pollinate plants so that seeds can be produced. They also produce honey for us to eat.

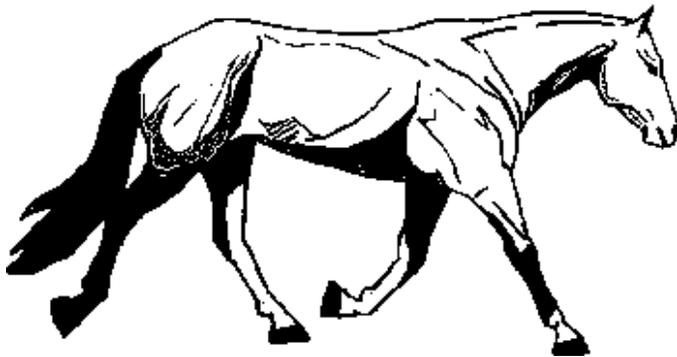
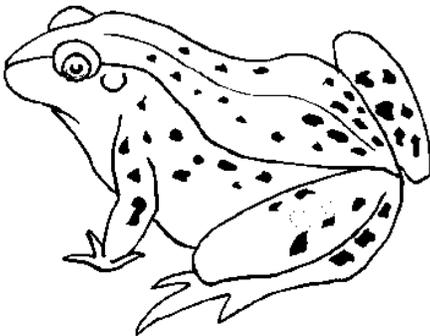
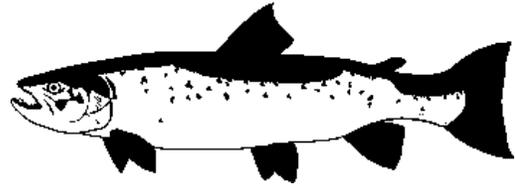
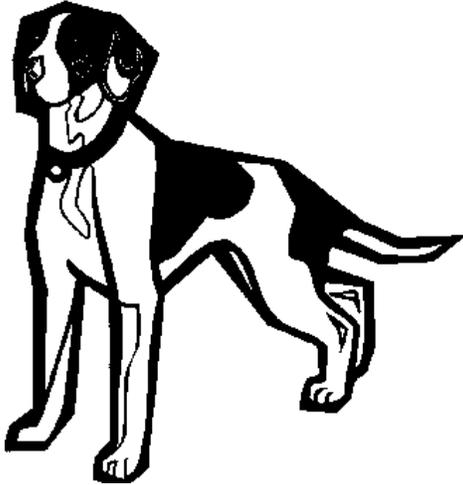
How can I show that I care about honey bees?

Draw a flower for the honey bee to pollinate.



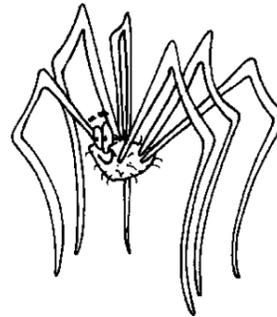
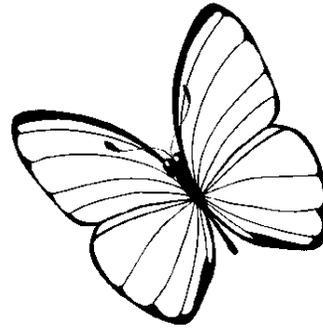
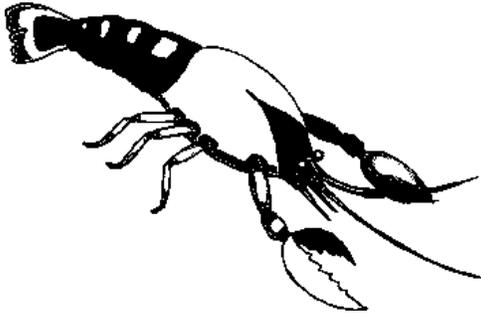
ADDITIONAL RESOURCES

Animals With a Backbone

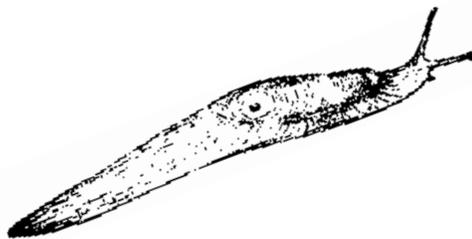


Animals Without a Backbone

Invertebrates With an Outer Skeleton

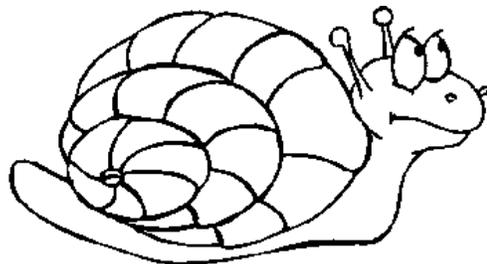
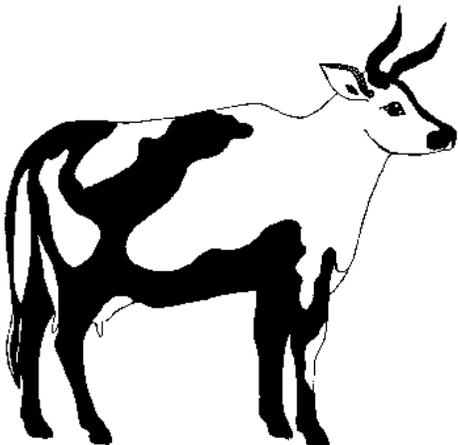
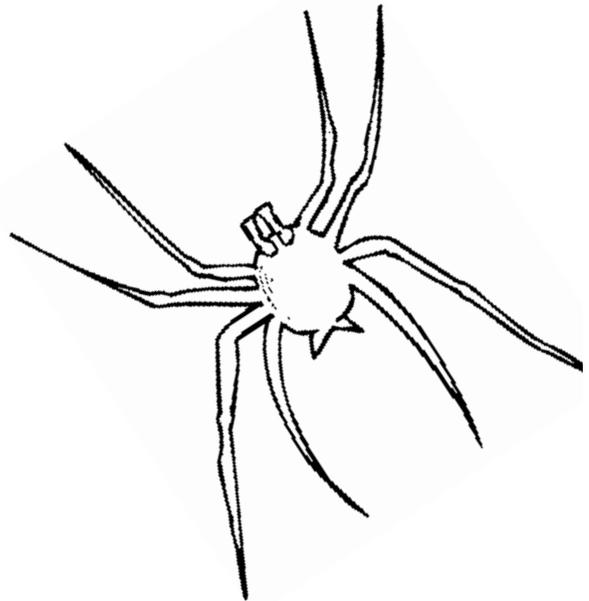
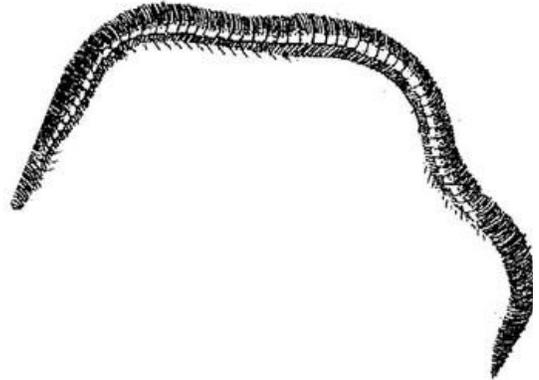
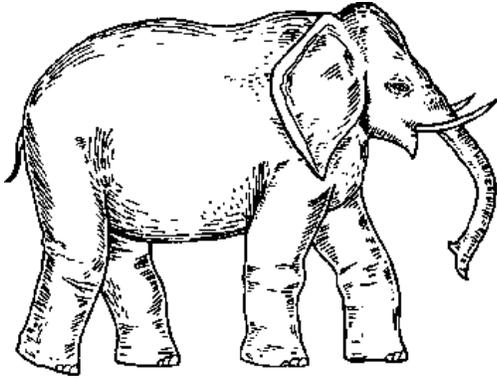


Soft Invertebrates



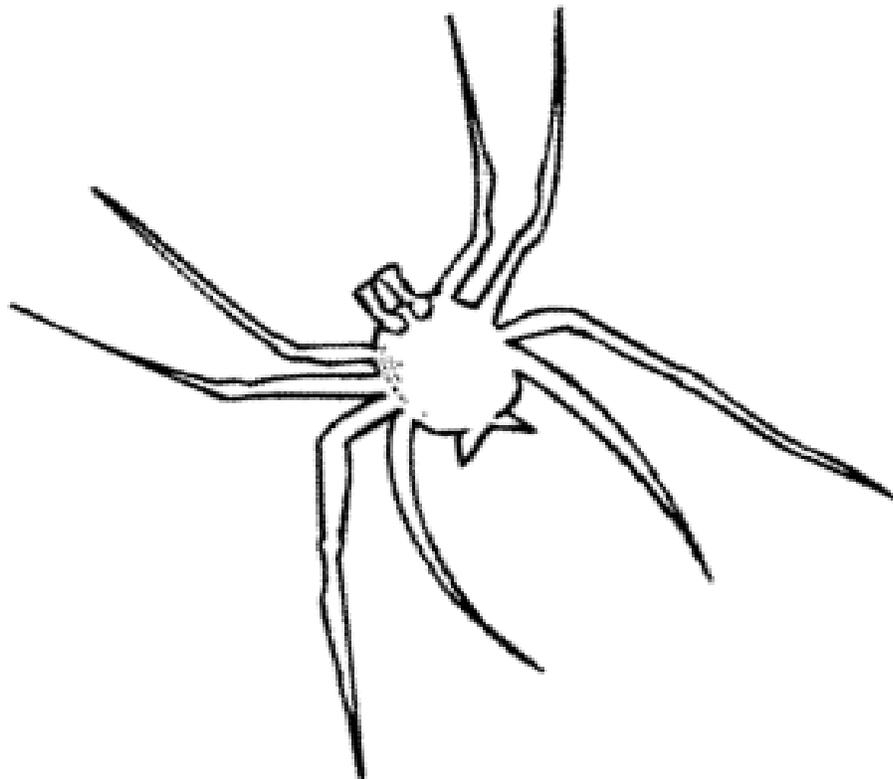
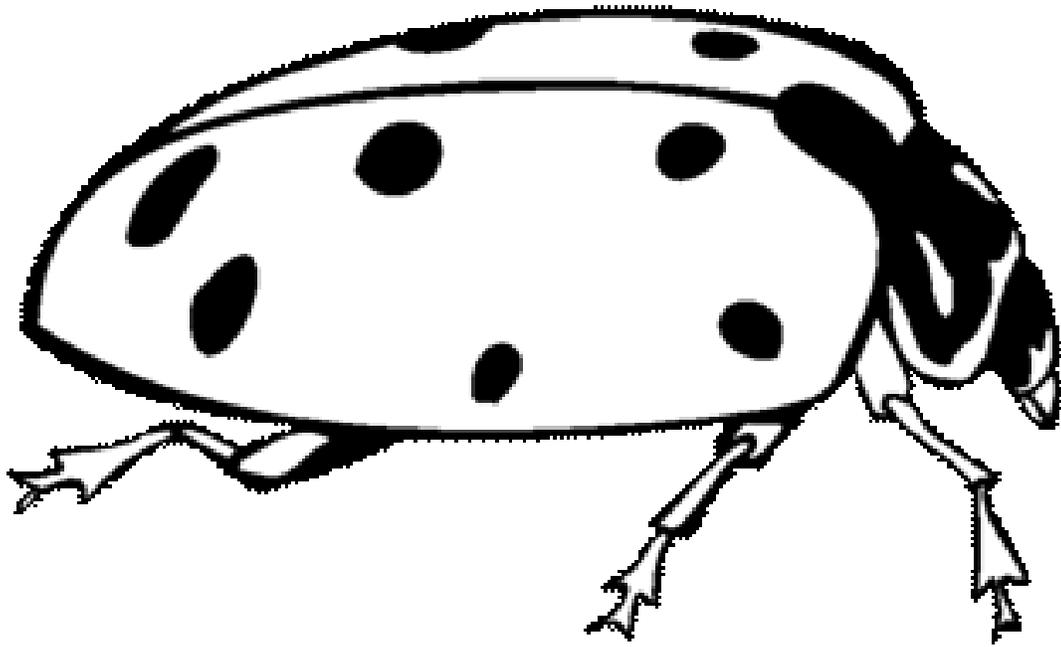
Backbone or No Backbone

Circle the animals which do not have backbones.



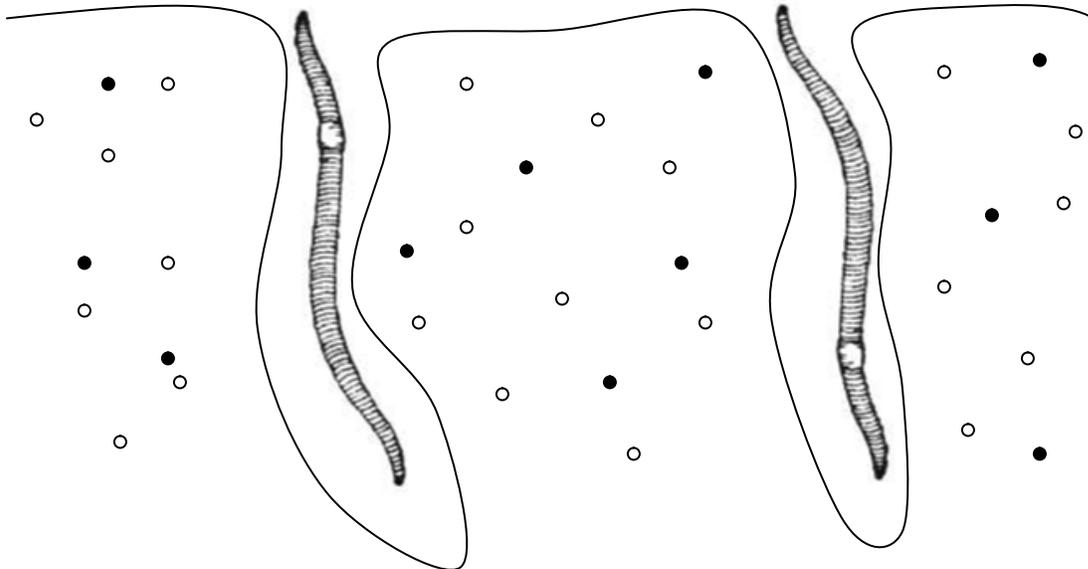
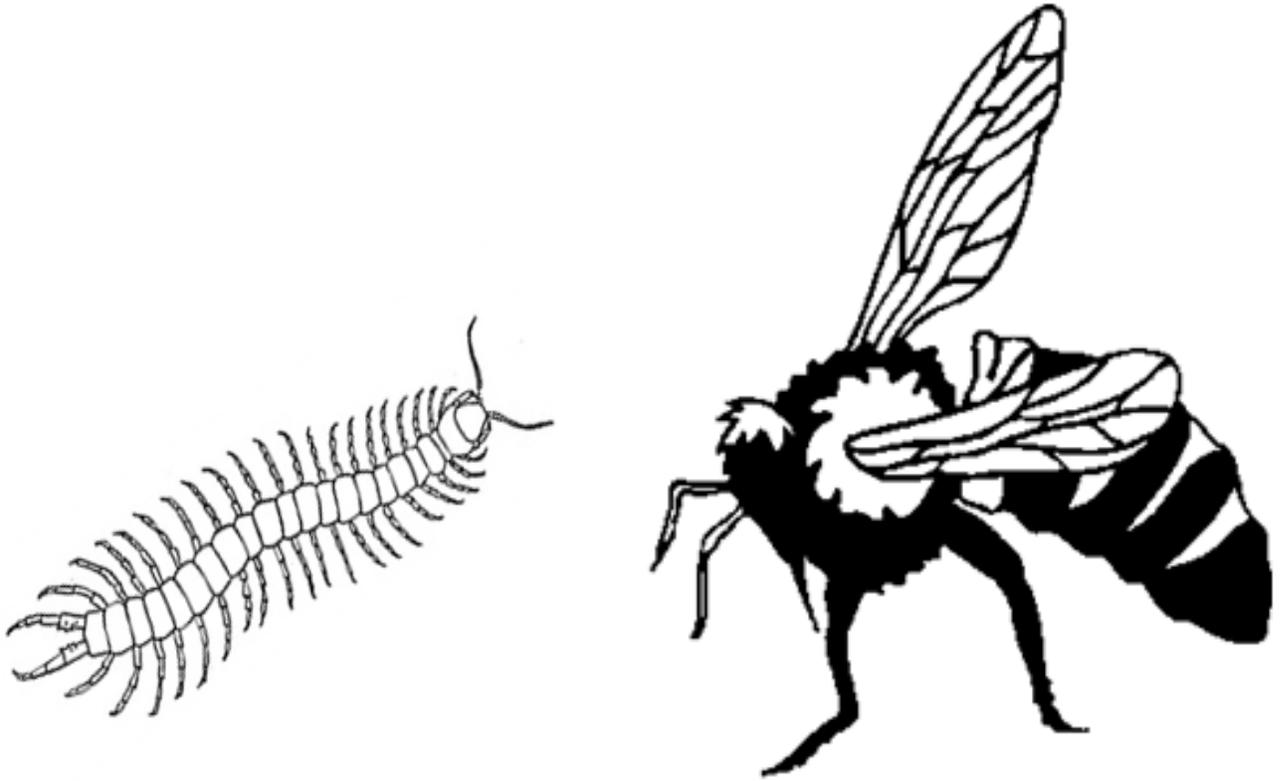
Bugs to Color

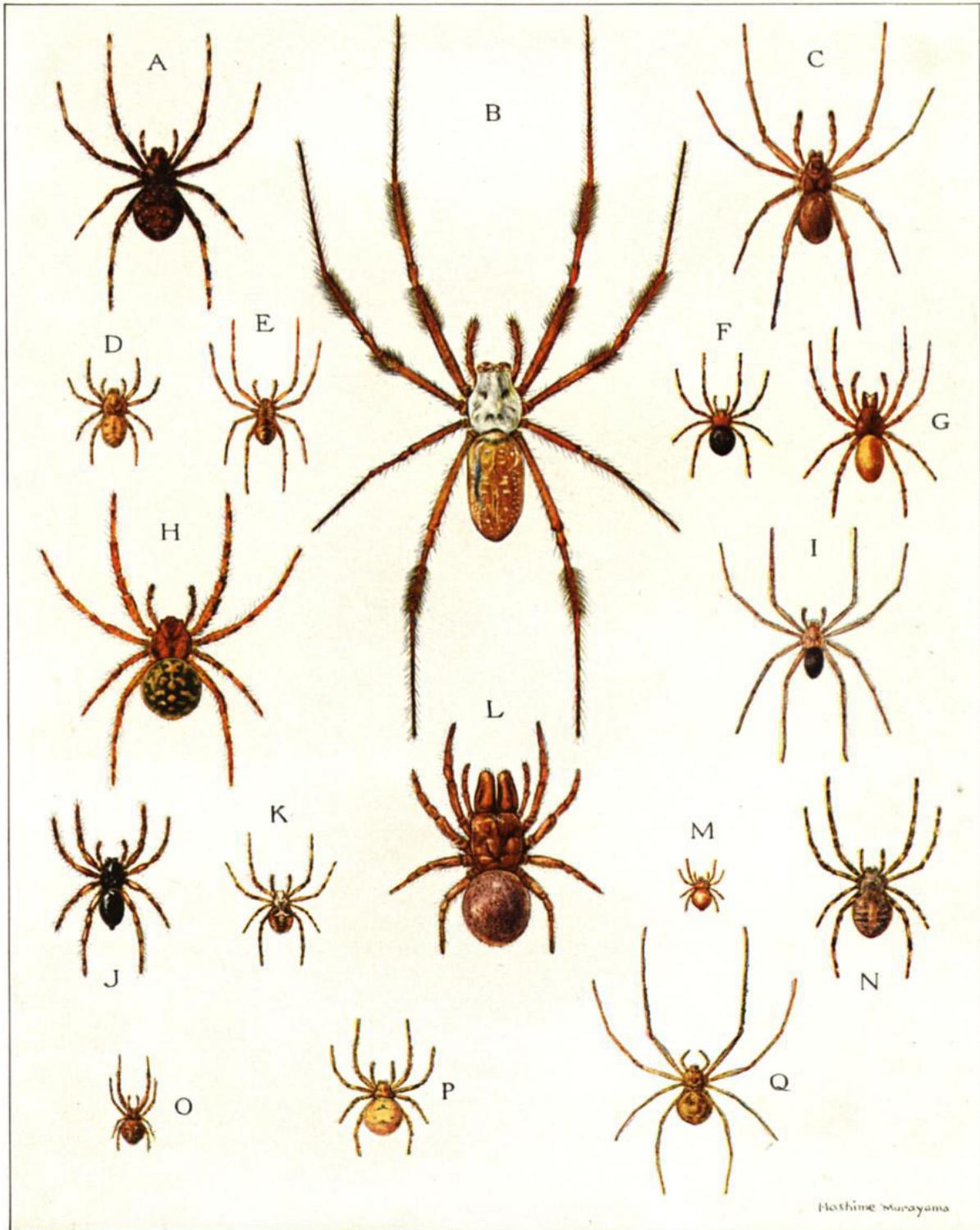
Name _____



Bugs to Color

Name _____





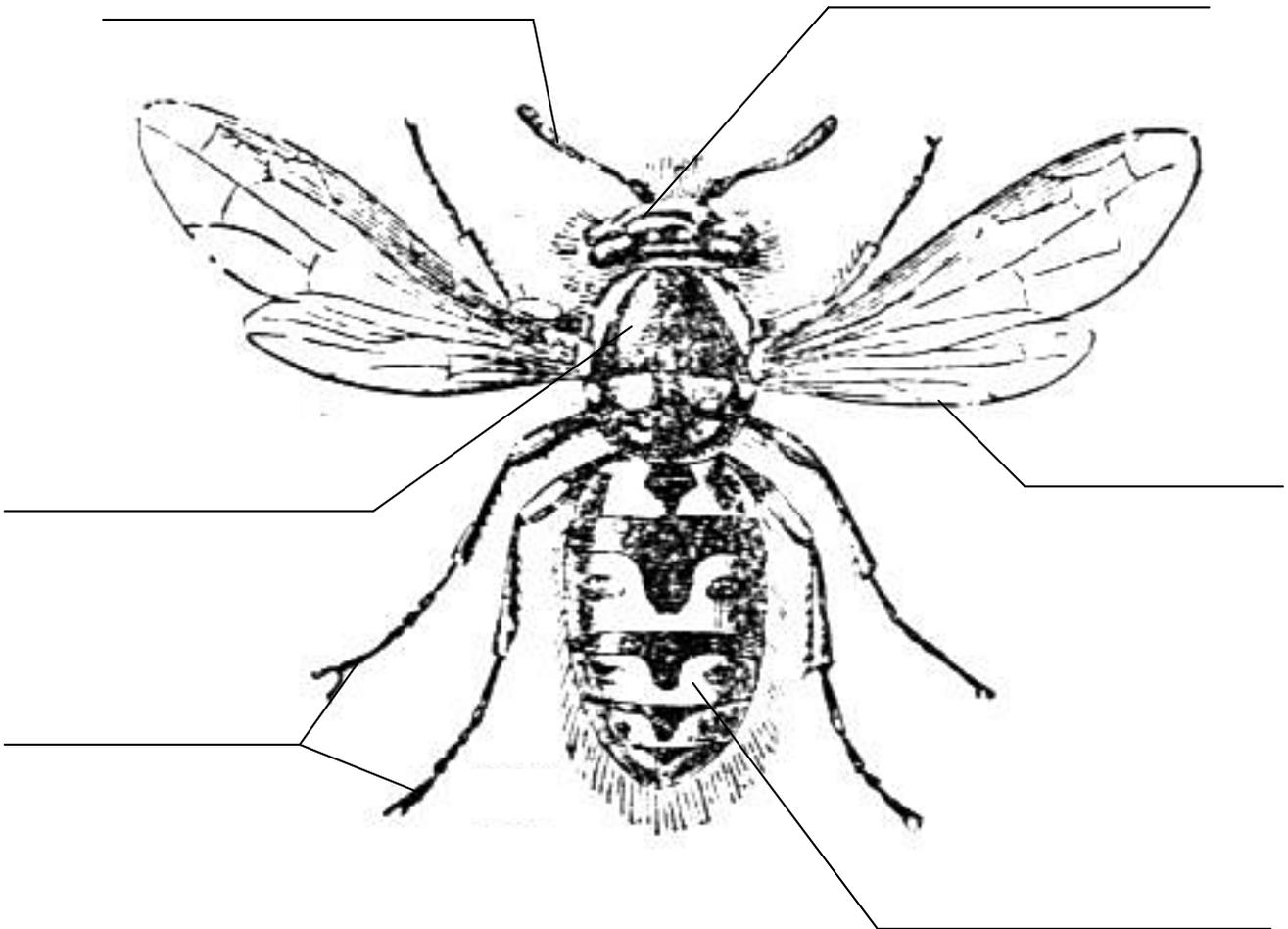
© National Geographic Society

Natural size

FABRICS OF MANY DESIGNS COME FROM THESE ASSORTED SPINNERS' LOOMS

A, *Araneus benjaminus*, H, *Araneus trifolium*, K, *Araneus labyrinthicus*, N, *Araneus vulgaris*, and P, *Araneus thaddeus*, make typical orb webs. B, *Nephila clavipes*, is a silk spider. C, *Filistata hibernalis*, D, *Amaurobius bennetti*, M, *Hyptiotes cavatus*, and O, *Uloborus americanus*, are hackled-band weavers. E, *Linyphia phrygiana*, spins a sheet. F, *Steatoda borealis*, produces mere cobwebs, and L, *Atypus abbotii*, fashions a tube. G, *Dysdera crocata*, I, *Loxosceles rufescens*, and Q, *Scytodes longipes*, have six eyes. J, *Zelotes ater*, is a drassid, moss spider (see pages 214, 218, 219, 224, 225).

Insect Anatomy

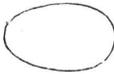


Word Bank		
Abdomen	Antennae	
Head		Legs
Thorax	Wings	

Name _____

Insect Development

Study the information in the chart. Answer the questions.

Insects develop from an egg into an adult in three ways:				
 egg	 young	 adult	Simple Change: As the insect grows, only its size changes. This is how a silverfish develops.	
 egg	 young	 adult	Incomplete Change: As the insect grows, it changes in size and develops wings. A grasshopper develops this way.	
 egg	 larva	 pupa	 adult	Complete Change: The adult insect looks very different from the young insect. This is how a butterfly develops.

1. What two things happen during incomplete change?

2. What insect becomes a larva and a pupa?

3. What is it called when an insect changes only in size?

4. How does a grasshopper change?

5. How does a silverfish change?

6. How does a butterfly change?

Brainwork! Use a library book to find another insect that looks very different when it is fully grown.

Answers to Insect Development Worksheet

Key

1. What two things happen during incomplete change?
It changes in size and develops wings.
2. What insect becomes a larva and a pupa?
Butterfly
3. What is it called when an insect changes only in size?
Simple change
4. How does a grasshopper change?
Incomplete change or as it grows, it changes in size and develops wings.
5. How does a silverfish change?
Simple change or as the insect grows, only its size changes.
6. How does a butterfly change?
Complete change or the different stages look completely different.

People Parts to Insect Parts Example

Complete a chart with your students comparing the number of people parts to insect parts.

	Parts Are Parts	
	People Parts	Insect Parts
Head	1	1
Chest	1	1
Arms	2	0
Legs	2	6
Antennae	0	2
Abdomen	1	1
Nose	1	0
Mouth	1	1