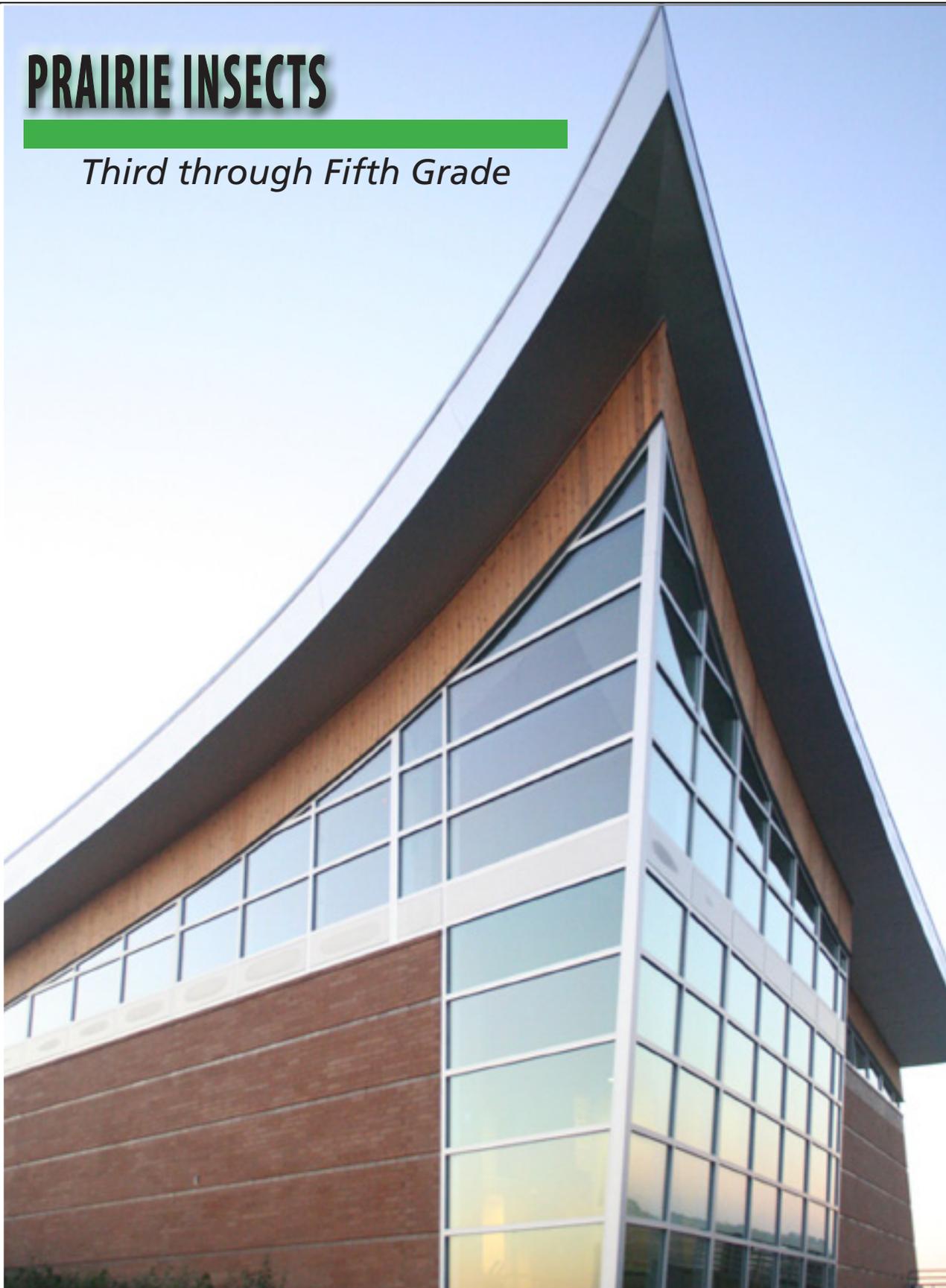


Free Land was the Cry!

PRAIRIE INSECTS

Third through Fifth Grade



Homestead

National Park Service
U.S. Department of the Interior

Homestead National Monument
of America, Nebraska



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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 determine the difference between grasshoppers and locusts.
- Students will determine the type of metamorphosis a grasshopper has.
- Students will experiment with insect camouflage and protective coloration.
- Students will write a comic book about a grasshopper superhero.
- Students will collect and compare different types of grasshoppers found at their homes, in the school yard and/or at Homestead National Monument of America.

NATIONAL STANDARDS

NS.5-8.1 SCIENCE AS INQUIRY

As a result of activities in grades 5-8, all students should develop an understanding of

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

NS.5-8.3 LIFE SCIENCE

As a result of activities in grades 5-8, all students should develop an understanding of

- Structure and function in living systems
- Reproduction and heredity
- Regulation and behavior
- Populations and ecosystems
- Diversity and adaptations of organisms.

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

Pre-Visit Activity #1 (suggested)



The folklore of the Great Plains touches on many insects, including buffalo gnats and Mormon crickets, but no creature so permeates the culture of this region as the grasshopper-and the Rocky Mountain locust in particular. During periods of favorable weather, these insects erupted from their “permanent breeding zones” in the fertile river valleys and spread over an area of nearly two million square miles. For half a century, outbreaks of this locust devastated farms in every state and province of the Great Plains, and this species was declared the single greatest impediment to the settlement of the region.

GRASSHOPPERS OR LOCUST:

Many people use the words grasshopper or locust interchangeably. However, there is a scientific difference between the two. The difference between the two is not body structure. It is a difference of behavior. Grasshoppers always look and act the same way. A grasshopper tends to stay in one place and leads a rather solitary life. Locusts can change how they look and behave. They can change from its solitary form

to a new form called its gregarious form where the locust gathers with others to form a large band of migrants. A locust in its solitary form will be colored green or brown. This allows for the locust to blend in and hide among the plants that it eats. In contrast, the gregarious form is brightly colored and stands out. This enables the group of locusts to see one another and stay together.

What causes a solitary locust

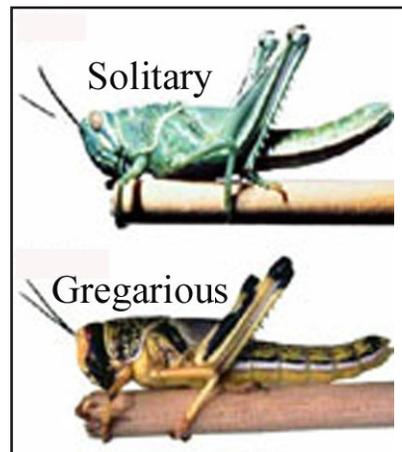
to turn into a gregarious one? If the area becomes too crowded with grasshoppers, they may all develop the urge to move on. If there is a period of drought, a fire, or a flood, they may need to leave their original feeding grounds to find

another place with more food. Body temperature is also an important factor. If their bodies become warmer than usual, they may move out of an area in a huge swarm.

Migrating locusts leave a wide path of destruction behind them. They

will eat everything in their path. After eating the leaves on trees, they will even feed on the bark. Feeding on grass in pastures leaves the plants so short that the plants are killed or permanently damaged. After the locusts leave, the farmers then have problems with wind and water erosion.

It is often difficult to control migrating insects. Farmers try to plow or disk cropland in the fall to bury the eggs deep enough so that the



Other Activities

Research and diagram the type of metamorphosis that grasshoppers undergo.



WHAT'S THE DIFFERENCE?

nymphs cannot emerge in the spring. Special metal guards or fences have been used to try and trap the moving locusts. Poisonous baits have been set out to try and kill the adults before they lay their eggs. Airplanes have been used to spray chemical pesticides over large areas as well.

Locusts are strong flyers and can fly amazing distances. African lo-

custs have flown all the way to England. People at sea have even sighted swarms of locusts as far as 1,200 miles out to sea! Early homesteaders often saw entire fields of wheat and corn completely destroyed by swarms of locusts.

Cicadas are sometimes called locusts, but they are not even close relatives.

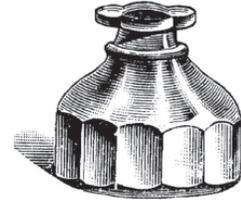
Locust Invasions from 1870 to 1880



Map of North America showing approximately the probable native home of the Rocky Mountain Locust in yellow; the country subject to invasion in orange and red, and the eastern limit reached by it in green. Prepared by C.V. Riley.

Pre-Visit Activity #1 (suggested)

Enrichment Activities



Write a comic book

Pretend you have been hired to create a male or female comic book superhero. That hero is a grasshopper in its non-superhero form. Do research to determine its appearance and behavior. Use the following guidelines to create an outline for your comic book:

- What does your grasshopper look like? What aspects of its appearance would you emphasize in creating your superhero?
- What aspects of its behavior would you use to develop its super powers?
- What is your superhero's name?
- When your superhero is not empowered and returns to life as an insect, where does it live and what does it do?

Science



Research to discover what led the The Church of Jesus Christ of Latter-day Saints to build a monument to sea gulls in Temple Square in Salt Lake City, Utah.

Other Activities

RANGER-LED EXPERIENCE

Insect Scavenger Hunt

Main idea: More insects are found on earth than any other type of animal. Students will have the opportunity to explore and collect insects from various habitats.

Objective:

1. To learn about the habitats of insects and other arthropods
2. To recognize insect roles in the environment
3. To explore insect diversity



Materials: insect nets, plastic bags or bottles for specimens

Procedure: See how many examples for each of the listed items you can find.

Item	Habitat	Possible Points	Points Received
An insect home		5	
A predatory insect		2	
An insect that uses camouflage		5	
An arachnid		2	
A crustacean		2	
A millipede		2	
A centipede		2	
An insect that lives in a society		2	
A decomposer insect		3	
An insect without wings		3	
An insect with 2 wings		2	
An insect with 4 wings		2	
3 different beetles		5	
An insect pollinator		3	
An insect belonging to the order Orthoptera		2	
An insect belonging to the order Hemiptera		2	
An insect belonging to the order Lepidoptera		2	
An insect belonging to the order Diptera		2	
An insect belonging to the order Hymenoptera		2	
An immature insect		3	
An insect egg		5	

Total: 58 _____

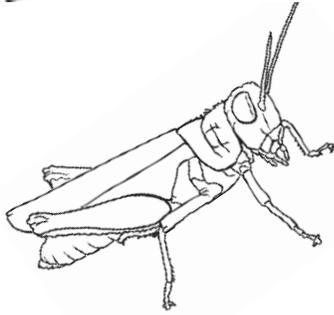
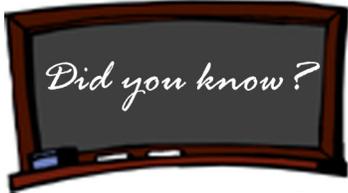
RANGER-LED EXPERIENCE



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)



The 1870s are remembered as grasshopper years in Nebraska, although the insects visited the state on other occasions. The worst grasshopper damage in the state's history occurred in July of 1874 when farmers saw whole fields of wheat, corn, potatoes, turnips, and other crops eaten by grasshoppers. As a result, some Nebraska homesteaders abandoned their claims and returned to the East. Fortunately the more prosperous 1880s helped Nebraskans to recover some of their losses.

INSECT CAMOUFLAGE

Grasshopper Environment

Create a natural setting environment to show how grasshoppers of different colors blend in with their surroundings.

1. Divide into groups of three. Using the grasshopper pattern, color one grass-green or leaf-green, one tan like sand, and one brown like soil. Cut each one out.
2. Arrange materials from nature such as grass blades, leaves, soil, rock, twigs, sand, and extras like seashells and small flowers for a touch of realism. Then in a small glass dish arrange the collected materials in one color range in a natural setting. Add the grasshoppers to the appropriate dishes. Are they easy to see?
3. Set up a display table with a sign that reads: Find the

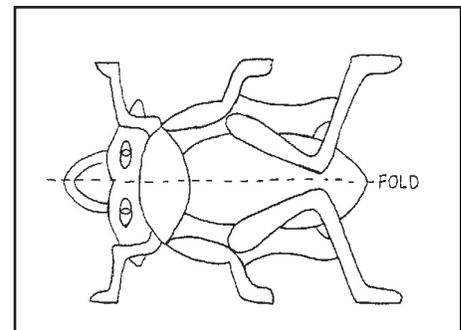


Hidden Grasshoppers! Invite another class in to view the display and see if they can find the grasshoppers.

Insect Camouflage

Experiment with insect camouflage and protective coloration.

1. Discuss how animals in nature protect themselves from other animals by blending in with their surroundings. What animals can students name that use their coloring to protect themselves?
2. Stand at the front of the room and hold up a large piece of black construction paper. Place a square of yellow, red, or white paper against it. Ask students if they can see the small square. Replace the paper square with a black one. Ask if the student's can see the smaller square now. Why is it easy to see



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>

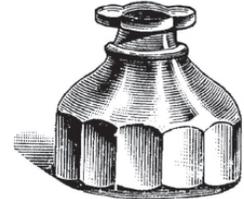
INSECT CAMOUFLAGE

Post-Visit Activity #1 (suggested)

one color against a contrasting background? Why is it difficult to notice a color against a background of the same color? Repeat this process using different colors—white against red; red against red; green against green; green against yellow, etc. Vary the distances.

3. Ask students if it is easier or harder to see one color against the same color background close-up? Why do you think so? What conclusions can you draw about an animal's ability to defend and protect itself by existing in an environment similar to its own color?

Enrichment Activities



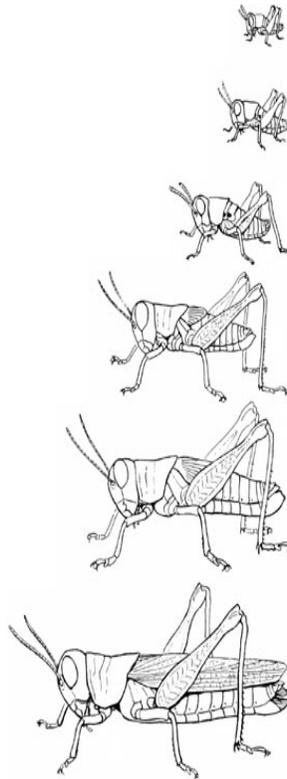
Research some of the historic plagues in the United States, such as those in the 1870's or 1930's. The following is an account of a locust invasion in 1875.

“It was the year 1875 that will long be remembered by the people of at least four states, as the grasshopper year. The scourge struck Western Missouri April, 1875, and commenced devastating some of the fairest portions of our noble commonwealth. They gave Henry [County] an earnest and overwhelming visitation, and demonstrated with an amazing rapidity that their appetite was voracious, and that everything green belonged to them for their sustenance. They came in swarms, they came by the millions, they came in legions, they came by the mile, and they darkened the heavens in their flight, or blackened the earth's surface, where in myriads they sought their daily meal.”

The History of Henry and St. Clair County, Missouri. 1883, National Historical Company, St. Joseph.

Gradual metamorphosis of a grasshopper

An illustration of gradual metamorphosis (paurometabolous development) in a grasshopper for the glossary.



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Explore an interactive beehive here:
<http://to.pbs.org/9AcREC>

Find out more about the life of a honey bee:
<http://bit.ly/9qJYVE>

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

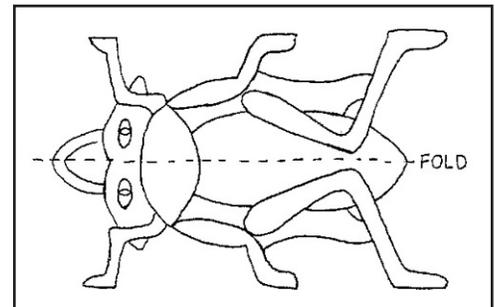
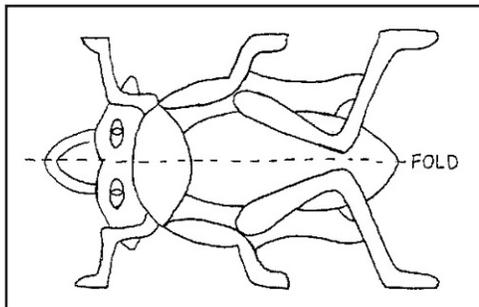
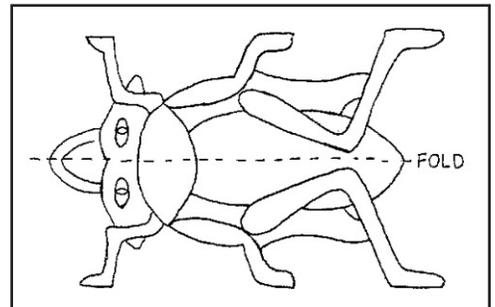
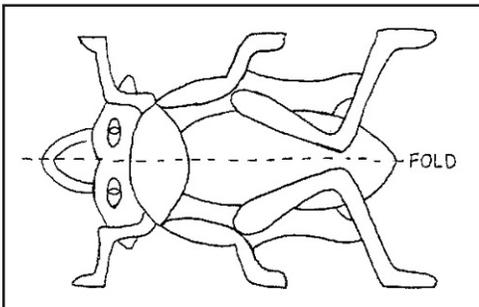
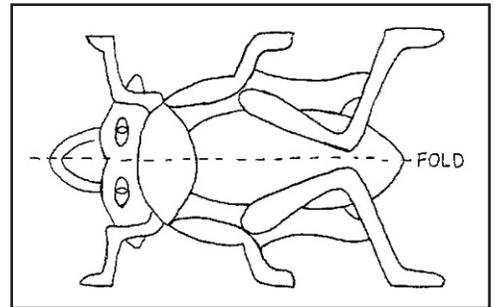
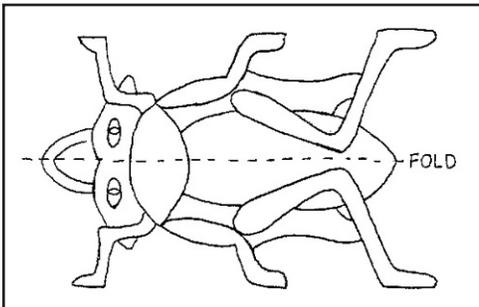
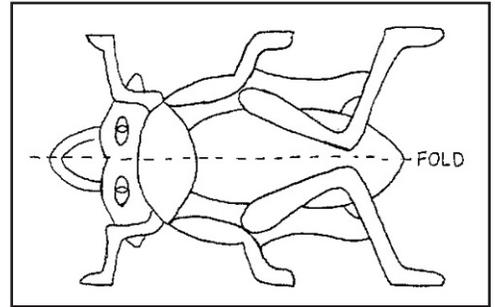
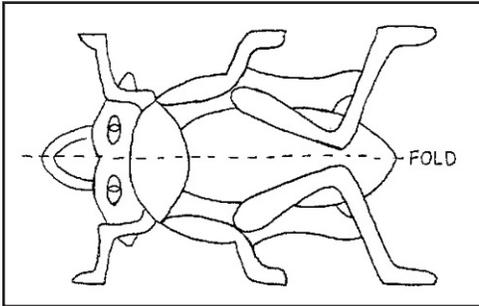
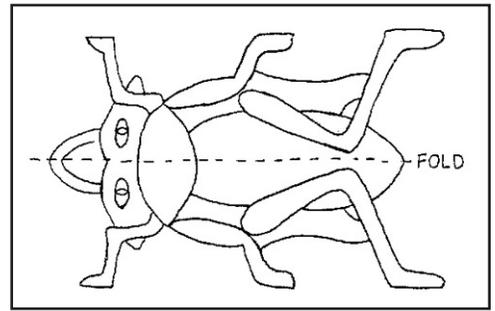
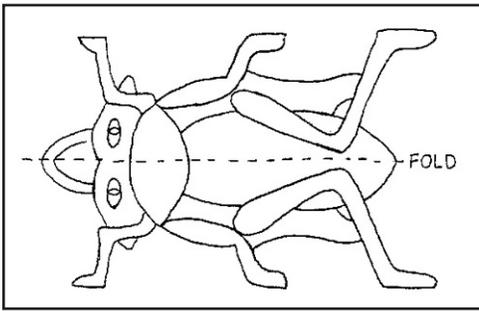
Fast Facts about insects:

- There are over 900,000 different kinds of insects.
- Insects live on all seven continents.
- At any given minute, there are 10 quintillion insects alive (quintillion has 18 zeroes)

Give students 3 minutes to see how many insects they can name.

Then give them an additional two minutes to come up with ways to help them.

ADDITIONAL RESOURCES



Name: _____

Insect Scavenger Hunt

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