Bug's Eye View

Objective

Students will construct butterfly nets and simple cages for observing insects. Students will record observations and classify insects. Students will write stories with insects as characters and write short research papers about insects.

Background

There are more different kinds of insects in the world than all other living things put together. Some are so small we need a microscope to see them. Others are several inches in size.

Insects are animals. The animal kingdom is divided into large groups called phyla. All the animals in one phylum have similar characteristics. All the animals that are invertebrates have no backbone. The skeletons of these animals, called exoskeletons, grow on the outsides of their bodies. The animals we usually call "bugs" are from the arthropod phylum of invertebrate animals with exoskeletons.

There are five common classes of arthropods: Insecta (the true insects—grasshoppers, beetles, crickets, butterflies); Arachnida (spiders, ticks, scorpions, chiggers); Chilopoda (centipedes); Crustacea (crawdads, shrimp, crabs) and Diplopoda (millipedes).

Insects eat by chewing, piercing and sucking, sponging or siphoning. Grasshoppers, cockroaches, beetles, earwigs, ants and caterpillars chew off and grind their food. They have chewing mouthparts called mandibles that they use like teeth. Stable flies, mosquitoes, adult fleas and sucking lice eat by puncturing tissue and sucking fluids. Their mouthparts are slender beaks or proboscis. Sponging mouthparts are composed of a proboscis with a spongy tip called a labellum. This is adapted for sucking up liquid or readily soluble food. This type of mouthpart is common to house flies, fruit flies and blow flies. Butterflies and moths have long tubes, which they use for sucking up fluids. Butterflies' taste organs are located in their front feet, and they need only step in a sweet solution to "taste" it.

Insects have many ways to protect themselves. Some, like bees and wasps, have painful stings that keep predators away. Some insects learn to change their colors and mimic the insects that taste bad or have a nasty sting. Others blend into the background.

Arthropods are important to the soil. Crayfish, mites, ants, centipedes, millipedes, sow bugs (roly-polies), insects and numerous other species help loosen up the soil by digging through it. They eat dead plants and animals in the soil and excrete them in a form that helps feed living plants. And when they die, their bodies make more organic matter in the soil. Since there are so many of them, and they live such a short time, they contribute hundreds of pounds of organic matter per acre to the soil every year. One insect, the ant, makes up 20 percent of the biomass of the earth. Healthy

Oklahoma Academic Standards

GRADE 1
Life Science: 1-1
Critical Reading and Writing:
W.1. Research: R.1,2,3; W.1,2,3

GRADE 2
Life Science: 4-1
Critical Reading and Writing:
W.1. Research: R.1,2,3; W.1,2,3

GRADE 3
Life Science: 1-1; 4-3
Critical Reading and Writing:
W.1. Research: R.1,2,3,4; W.1,2,3

GRADE 4
Life Science: 1-1
Critical Reading and Writing:
W.1. Research: R.1,2,3; W.1,2,3

soil is alive with millions of organisms, some too small to see. In fact, there are more insects and other organisms living below the soil than there are living above it.

Science

1. Read and discuss background and vocabulary and the sidebar about arthropods.
2. Students will use plastic cups to construct simple cages for capturing and observing insects.
   — Cut the bottom half off one of the plastic cups. Discard the bottom and keep the top.
   —Using a low temperature hot glue gun, run glue around the rims of the cup tops, and cover the openings with the tulle. Caution students not to glue their cups to the table. Use the covered cup tops as lids for the uncut cups.
3. Students will use their insect observatories to observe insects they collect on the schoolyard or at home. Each observatory should hold only one insect.
4. To catch flying insects, students may make butterfly nets as follows:
   —Fold the netting in half.
   —Sew a seam up the length of the netting, leaving casing free.
   —Bend hangers so they form a circle. Leave the hooks as they are.
   —Fold the netting over the tops of the hangers.
   —Stitch the netting in place, leaving the hooked end of the hanger free.
   —Fasten the end of the net with a rubber band.
   —Bend the hook of the hanger so it will fit inside the PVC pipe.
5. Brainstorm the following:
   —the different ways insects eat
   —the different ways insects move
   —the different ways insects protect themselves
6. Students will use online or library resources to research answers to questions about the insects they have captured. (Worksheets provided with this lesson.)
7. Locate some larvae and bring it to class along with a sample of the plant on which you found the larvae and several other kinds of plants.
   —Students will observe the larvae and determine which plants it will eat and which it will not eat.
   —Students will use online or library resources to find out if insects eat different foods in different stages of development.
8. Students will examine soil samples with a magnifying glass to identify decaying insect parts.
9. Lay a board on the ground, and leave it for two weeks. When the two weeks have passed, turn the board over.
   —Students will count how many insects and other creatures they see.

English Language Arts

1. Students will write stories with their insects as central characters.

Materials

(for each student)
2 clear plastic cups (6-8 oz)
5-inch square tulle (netting)
glue gun
scissors
field guides and books about insects
1 piece of nylon netting or tulle, 2 ft by 3 ft
1 coat hanger
1 PVC pipe, 3 or 4 feet long
needle and thread
1 rubber band

2. Students will use online or library resources to research the insects they have captured and write short research papers.

Extra Reading

Llewellyn, Claire, *The Best Book of Bugs*, Kingfisher, 2005.

Mound, Laurence, *Insect (DK Eyewitness Books)*, DK Children, 2007.

Stetson, Emily, and J. Susan Cole Stone, *Kids' Easy-to-Create Wildlife Habitats*, Williamson, 2004.

Winner, Cherie, *Everything Bug: What Kids Really Want to Know about Bugs (Kids FAQ),* NorthWord, 2004.

Vocabulary

arthropod—any of a phylum of invertebrate animals (as insects, arachnids, and crustaceans) having a segmented body, jointed limbs, and a shell of chitin that is shed periodically

biomass—the amount of living matter in a specified habitat

exoskeleton—a hard supporting or protective structure (as of an insect, spider, or crustacean) on the outside of the body

insect—any of a class of arthropods (as butterflies, true bugs, two-winged flies, bees, and grasshoppers) with the body clearly divided into a head, thorax, and abdomen, with three pairs of jointed legs, and usually with one or two pairs of wings

invertebrates— lacking a backbone

labellum—the lower lip of an insect.

mandibles—insect mouth parts used for holding or biting food

phylum—a group of animals or plants sharing one or more major characteristics that set them apart from all other animals or plants and forming one of the main categories in biological classification that ranks above the class and below the kingdom

proboscis—elongated snout of an insect used for food intake

Name_____

Research Worksheet

The animals we usually call "bugs" are from the arthropod phylum of invertebrate animals with exoskeletons. The most common classes of arthropods are:

 Insecta, The true insects—grasshoppers, beetles, crickets, chiggers, butterflies	Arachnida—spiders, ticks, scorpions 	 Crustacea—crawdads, shrimp, crabs	Diplopoda—millipedes 	 Chilopoda—centipedes

Research to find the following information about the insect you have captured.

What is your insect's common name? _____

What is your insect's scientific name? _____

Where did you find your insect (in the dirt, crawling in the grass, on a tree)?

_____

Find the scientific order and class of your insect.

Order_____Class_____

Draw a picture of your insect's mouth. If possible, watch it eat something. How do you think this insect eats?

___By chewing, like a beetle
___By piercing and sucking, like an aphid
___By sponging, like a house fly
___By syphoning with a long tube, like a butterfly
___By chewing, like a beetle.
___By piercing and sucking, like an aphid.
___By sponging, like a house fly.
___By syphoning with a long tube, like a butterfly.

How does this insect move? _____

How do you think this insect protects itself? _____

On the back of this page, draw a picture of your insect and write a paragraph describing it. (What color is it? How many legs does it have? What makes it different from other insects? What else is interesting about this insect?)