



Frisch's Outreach: Insects and Their Relatives (Gr.4-6) Extensions

This program will allow students to explore insects and other arthropods.

Goal(s)

This class is designed to familiarize students with the many unique adaptations insects and other arthropods possess.

natural balance of our world.

Theme

Insects and other arthropods have unique adaptations that help them survive in many different habitats.

Objectives

1. Students will be able to name the differences between insects and other arthropods.
2. Students will be able to identify at least three body parts of an insect.
3. Students will be able to describe the importance of insects and other arthropods in the

Sub-themes

1. Insects and other arthropods are quite diverse in their adaptations.
2. The number of Insects and other arthropods is immense.
3. Insects and other arthropods are very beneficial to the natural balance in our world.

Academic standards

Ohio Science Academic Content Standards	<p><i>Fourth Grade Standards</i> Life Sciences Diversity & Interdependence of Life 5 Scientific Ways of Knowing 1</p> <p><i>Fifth Grade Standards</i> Life Sciences Diversity & Interdependence of Life 4,5,6 Doing Scientific Inquiry 3 Scientific Ways of Knowing 1</p> <p><i>Sixth Grade Standards</i> Life Sciences Characteristics & Structure of Life 2</p>
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	Diversity & Interdependence of Life 8 Scientific Inquiry Doing Scientific Inquiry 3,4 Scientific Ways of Knowing Nature of Science 1 Science & Society 3
Kentucky Core Content— Science	Life Science: Grades Primary through 4: <i>The Characteristics of Organisms</i> : SC-E-3.1.2, SC-E-3.1.3 <i>Life Cycle of Organisms</i> : SC-E-3.2.2 <i>Organisms And Their Environment</i> : SC-E-3.3.1 <i>Diversity and Adaptations of Organisms</i> : SC-M-3.4.1, SC-M-3.5.2 Grades 5-7 Structures & Function in Living Systems SC-M-3.1.1 Regulation & Behavior SC-M-3.2.1 Populations & Ecosystems SC-M-3.5.1, SC-M-3.5.2

Background

Insects and their relatives are among the most interesting and diverse animals in our world. Their numbers are as vast as the places they inhabit. About $\frac{3}{4}$ of all known species are arthropods. Insects alone could number up to 1 quintillion.

When classifying animals scientists have divided all known animals on Earth into 26 large *Phyla* (a broad collection of animals with important common characteristics). There are far more species in Arthropoda than all other species combined. Arthropods (*Phyla-Arthropoda*) share the characteristics of an exoskeleton, jointed legs, and segmented bodies (except mites and most spiders) and molting.

Some of the classes of Arthropoda that may interest this group of learners could include Insecta (insects), Arachnida (spiders and their relatives), Merostomata (Horseshoe Crabs), Chilopoda (centipedes), Diplopoda (millipedes), Crustacea (crabs, lobsters, shrimp, crayfish).

When discussing some of the classes of Arthropods the class Insecta and Arachnida hold many people's fascination. These animals not only

possess very extreme characteristics but can at times cause difficulty for other species. Crop and food stuff destruction can be caused by large numbers of some insects. Conversely, some insects can be extremely beneficial in maintaining the natural balance of other insect populations and in the benefit of pollination. All members of this Phyla have a vital role in the natural balance of our world.

Vocabulary

Abdomen- this posterior portion of the body contains organs digesting food, reproducing, and getting rid of waste

Antennae- the two "feelers" used to smell, feel, and in some cases taste and hear.

Arthropod- animals with jointed legs, an exoskeleton, and a segmented invertebrate body

Cephalothorax- the joined head and thorax of spiders

Cerci- two sensory appendages at the end of the abdomen of the female mosquito and other insects (cercus *singular*)

Chelicera- either of the first pair of mouthparts of spiders, resembling fangs or pinchers and used to grab or poison prey (*chelicerae plural*)

Chitin- a tough semitransparent substance that forms part of the protective cuticle of some insects and other arthropods

Compound eye- an eye made up of many simple eyes that function together

Complete metamorphosis- growth stages that include egg, larva, pupa, adult

Ectothermic- an animal that maintains its body temperature by absorbing heat from its surroundings

Entomologist- one who studies insects

Exoskeleton- an external skeleton, made of chitin, which serves as a supporting and protective structure

Head- the first segment of the adult insect's body. The antennae, eyes, and mouthparts are found here.

Incomplete metamorphosis-growth stages of egg, nymph, adult

Insect- an animal with three body parts (head, thorax, abdomen), one pair of antennae, six legs, two pair of wings (if any), one pair of compound eyes

Invertebrate- animal without a backbone (insects, crabs, worms)

Larva/Caterpillar- immature form of some animal that undergoes radical transformation into an adult

Metamorphosis- The larva spins a

cocoon. The larval structure breaks down and reforms into adult organs.

Molt- when the exoskeleton becomes too small, it splits open around the head and down the back.

Nymph- the second stage of incomplete metamorphosis. The insect looks like a miniature adult. It has no wings and cannot reproduce

Pedipalps- either of a pair of appendages that are part of the mouths of spiders and other arachnids, used for various functions including manipulating food

Pollination- the transfer of pollen from the stigma of one flower to the stigma of another by wind, water, insects, birds

Pheromones- a chemical compound, produced and secreted by an animal, that influences the behavior and development of other members of the same species

Pupa/Cocoon/Chrysalis- non-feeding third stage of complete Metamorphosis. The larva spins a cocoon. Larval structure breaks down and reforms into adult organs.

Spinnerets- tiny tubular structures, usually one of two pairs that exudes the fluid produced by the abdominal glands of a silk-producing spider

Thorax- the body region between the head and the abdomen. This region bears the walking legs and wings.

Vertebrate- animal with a backbone

Assessment

Unsatisfactory—student seems uninterested, does not participate, and does not answer questions

Satisfactory—student seems somewhat interested, participates to some degree, and attempts to answer questions when asked

Excellent—student seems very interested; participates willingly in all activities, and answers questions. Student offers his or her own questions.

Extensions

Who Am I?

Play a "Who am I?" game. Tape a picture of an Arthropod on the back of a student without identifying it. Allow the rest of the class to see the picture. Encourage the student with the picture to ask the group yes/no questions as a means of identifying the Arthropod. The student's questions may focus around adaptations (ex. body coverings and behavior), habitat, food choice, etc.

And The Winner Is.....!

Organize a class or school wide "Beauty Contest". Through research find the contestants, but they must be animals (photos, drawings, sculptures, etc.) that people may find "Creepy". During the contest try to creatively let everyone know what each animal looks like. Also, be sure to creatively give each contestant a chance to show their wonderful attributes (how they move, eat, defend themselves, and especially how they benefit our natural world). Give everyone the chance to vote. You may even want to define categories so to have many "winners"!

My Life As.....!

Write journal entries detailing your life as an Arthropod (insect, arachnid, etc.) Tell what each day would be like. What is easy about your life? What is difficult? Be sure to tell why your life is important to our natural world!

Insect Eye View

What would the world look like to an Insect? Pick a spot on the playground, classroom, or cafeteria and position yourself to experience it like an insect. Can you draw what you see from an insect's perspective?

My How You've Changed!

Imagine yourself as an Insect or other Arthropod! What would you look like? Draw, paint, sculpt or write about what you would look like! Be sure to let others know it really is you- but *slightly* different! What could you do now that you have all of those wonderful adaptations?

Who Are You?-Sniff and Find!

To experience how insects (and other animals) use pheromones to locate one another place common household scents (be aware of allergies) on cotton balls in small canisters with lids with holes placed in the tops. Have duplicate scents. Distribute the scent jars to the group. Can they "Sniff and Find" the corresponding sent by traveling among the students in the group to find a match? Discuss how difficult it must be for animals to find each other this way!!

Resources

Broda, Herbert, [Schoolyard Enhanced Learning:Using the Outdoors as an Instructional Tool K-8](#), Stenhouse Publishers, 2007.

Doris, Ellen. Entomology: Adventures, Projects, and Ideas for Exploring the World of Insects.
(Thames and Hudson, 1993)

Ellen, Doris. Meet the Arthropods.The Children's School of Science,
Massachusetts.1996.

Louv, Richard.Last Child in the Woods:Saving Our Children From Nature Deficit Disorder. Algonquin Books, 2005.

Preston Mathem, Rod. The Book of Spiders, Eagle Editions, Quarto Publishing. 1998.

Websites:

ALA's Great Websites for Kids:

Animals

<http://www.ala.org/gwstemplate.cfm?section=greatwebsites&template=/cfapps/gws/displaysection.cfm&sec=1>

Awesome Library – Kids

<http://www.awesomelibrary.org/Classroom/Science/Animals/Animals.html>

Awesome Library – Teachers

<http://www.awesomelibrary.org/Classroom/Science/Animals/Animals.html>

Cincinnati Zoo & Botanical Garden

www.cincinnati-zoo.org

ENature

www.enature.com