INSECT VILLAGE

TEACHER PRE-VISIT

EXHIBIT HIGHLIGHTS

Feeling outnumbered? It's not surprising. Approximately 95% of all animal species on the earth are insects. Stand alone on a piece of land half the size of a soccer field and there may be as many as one million insects standing with you!

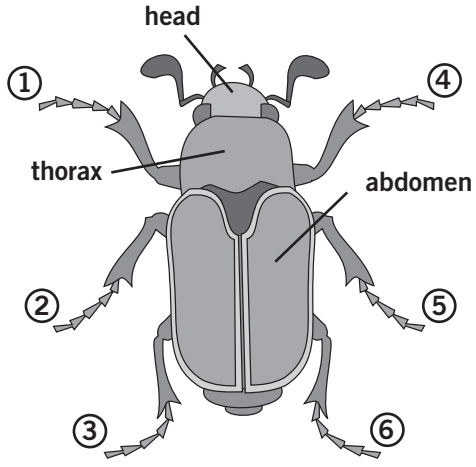
Welcome to Pacific Science Center's **Insect Village**! See live representatives from just a handful of the 800,000 species of insects we share this planet with. Marvel at the heaviest, strongest, and most surprising insects in the world at the Insecta-Side Show. Giant robotic arthropods dot the landscape, giving visitors a magnified view of their hard-shelled anatomy. Visit a working beehive and witness the eusocial behavior of these interesting insects as they house and feed their colony. Students may walk in knowing little about insects, but leave as honorary entomologists as they learn what an insect is and *is not* and how the insect impact on humans is inescapable, and more often than not, beneficial and fascinating.

INSECT INFORMATION

Insects make up a significant proportion of the animal kingdom. Estimates range from as few as 500,000 species to as many as 900,000 and many thousands of new species are discovered each year. There are three to four times as many species of insects than all the other species of animals of the world combined. Ants and termites alone are estimated to contribute to as much as 20% of the animal biomass of Earth! One out of every four species on Earth is a beetle! Insects are found everywhere except at the poles and occupy every habitat. Fossil records show that many species exist today in much the same form as they did 200 million years ago. Obviously, insects are an extremely successful class of creature. Their biological success is attributed to their small size, their high reproductive rate and the adaptive ability of the class overall, which is evidenced in their enormous variety of forms and ways of life.

Insects are classified as occupying the Kingdom of Animalia, the Phylum Arthropoda, which means "joint-footed", and the Class of Insecta. Insects are divided into about 30 different orders, which include Orthopetera (grasshoppers – 5,300 species) and Hemiptera (true bugs – 23,000 species). Many orders of insects grow through complete metamorphosis which involves four stages: egg, larva, pupa and adult. The immature stages of these insects bear no resemblance to the adult stage and they often occupy a different habitat than the adult. This type of metamorphosis may involve the use of a cocoon or chrysalis at the pupa stage such as with Lepidoptera (butterflies and moths). Other orders of insects grow through incomplete metamorphosis, where the newly hatched insect is a miniature version of the adult. Order Phasmatodea (stick insects) are an example of this type of metamorphosis.

To be classified as an insect, an animal must have six legs, a head, thorax and abdomen.



IMPORTANT NOTES TO TEACHERS:

The **Tropical Butterfly House** is housed in the **Insect Village** and has special guidelines for visitation. Please see the **Tropical Butterfly House** Pre-Visit for additional information.

PRE-VISIT DISCUSSION

- Many people fear most insects. Why? Are there insects that most people like? Discuss characteristics of all insects and let students share their thoughts on why they like or dislike insects. Ask students to think about insects that are beneficial to humans.
- Some characteristics of living organisms are that they eat, grow and reproduce. Make a list of what students know about how and what insects eat, how they grow, and how they reproduce.
- Let each student draw an insect they find interesting and label the parts, without the aid of a book or other resource. Display the pictures. Ask student to carefully observe insects during their visit to the **Insect Village** to see if they need to make any changes to their drawings.
- One undeniable characteristic of insects is that they are biologically successful (see other side of this paper). Ask students to think about and discuss why they think insects are so successful.
- Ask students to name the differences between spiders and insects. Add this to the list of what students know.

POST-VISIT DISCUSSION

- Review and amend any list you may have made of students' prior knowledge of insects, including the differences between insects and other classes of arthropods, such as spiders.
- Let each student make changes to the drawing they made prior to the visit to the **Insect Village**. Discuss any changes they needed to make to their drawings.
- Go on a mini field trip outside to find and observe (without disturbing) insects. What behaviors do the students observe?
- An entomologist is a scientist who studies insects. What do students think an entomologist learns about insects? How might her or his discoveries be helpful? Let students imagine themselves as entomologists. What would they like to find out about insects and how would they go about finding out?



Please feel free to use the Student Activity Sheet, in part or whole, as an on-site activity for your class.

Washington State Essential Academic Learning Requirements in Science Addressed:

Essential Learning 1: The student understands and uses scientific concepts and principles.

1.1.6 Characteristics of living Things: Distinguish living organisms from non-living objects, and use characteristics to sort common organisms into plant and animal groups.

1.2.7 Molecular Basis of Heredity: Describe the life cycles of plants and animals, and recognize the difference between inherited and acquired characteristics.

1.3.10 Interdependence of Life: Describe how an organism's behavior and ability to survive is influenced by environment, other life forms, and the availability of food and/or other resources.

Essential Learning 2: The student knows and applies the skills, processes, and nature of scientific inquiry.

2.1.1 Questioning: The student asks questions about interesting objects, organisms, and events in the environment.

Reading Essential Learning 3: The student reads different materials for a variety of purposes.

3.1 Read to learn new information.

3.2 Read to perform a task.

INSECT VILLAGE

STUDENT ACTIVITY SHEET

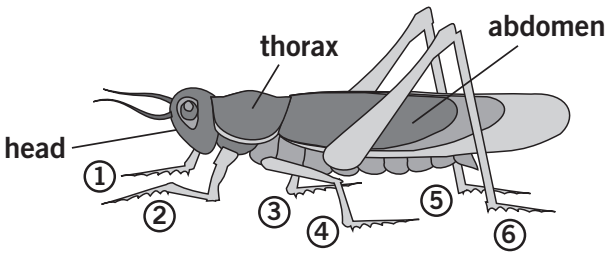
INSECT BRIEFING

INSECT INFORMATION

Feeling outnumbered?
Well you are, by insects! Approximately 95% of all animal species on the earth are insects. Stand alone on a piece of land half the size of a soccer field and there may be as many as one million insects standing with you! One out of every four species on Earth is a beetle! Insects are found everywhere except at the poles and occupy every habitat. Obviously, insects are extremely successful animals.

Many insects grow through *complete metamorphosis* which involves four stages: egg, larva, pupa and adult. The immature stages of these insects look nothing like the adult stage. Most people think of a caterpillar (pupa) changing into a butterfly (adult) when they think of this kind of metamorphosis. Other kinds of insects grow through *incomplete metamorphosis*, where the baby insect (nymph) looks like a tiny version of the adult. Stick Insects are insects that grow through this type of metamorphosis.

To be classified as an insect, an animal must have six legs, a head, thorax and abdomen.



Choose something interesting you found in the **Insect Village** and draw it here.

INSECT EXPLORATION

Work with another student to find the answers to these questions. Write about what you learn.

Yummy! Some insects are food, make food for us, or are in the foods we eat. Find one example and write what it is here:

_____

_____

How do you feel about eating insects?

_____

_____

Insects eat! Different insects have evolved with mouth parts adapted to different foods they eat. How are these mouths different? Are any parts the same?

_____

_____

Not an insect! Find one animal in the **Insect Village** that is not an insect and describe how it is different from an insect.

_____

_____

THINGS TO THINK ABOUT AND DO

THINGS TO LOOK FOR AND THINK ABOUT:

- Watch one of the live insect displays for two minutes. Describe what you see.

- Write one question you had as you observed the display.

- Put a check mark next to things you see in the display:
  - ❑ Insects eating
  - ❑ An insect that is perfectly still
  - ❑ An empty skin
  - ❑ 2 or more insects interacting with each other
  - ❑ An insect walking or climbing

- Read the signs on the Termite City. What are the different groups of the colony and how do their bodies fit their job?

- Write the name of your favorite thing about the **Insect Village** and something you liked about it.

- Ask another student which is his or her favorite thing about the **Insect Village** and why. Write the answer here.

- Read the signs in the Insecta-Side Show and in the Insect Zoo. Many insects have special adaptations or capabilities. Write the name of the insect, what its "super-power" is and why you would like to have that super-power.

- How does this insect's "super-power" help it survive in its environment?

TAKE IT AWAY:

- Write one new fact you learned, or something that surprised you today about insects or the **Insect Village**. Share this with someone you live with.