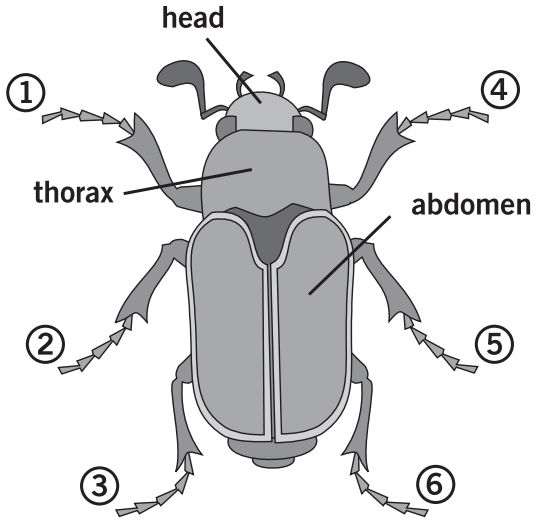
INSECT VILLAGE

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. If available, 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 as 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 biomass of Earth! One out of every four species of animals 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). A few 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 NOTE 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 flyer for additional information.

PRE-VISIT DISCUSSION

- Some people dislike or fear insects. Why? Are there insects that most people like? Discuss characteristics of insects and let students discuss why they like or dislike insects.
- 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, without referring to a picture. Label the parts. As age appropriate, let students also write a description of how the insect uses each of those parts to survive.
- Ask students to name the differences between insects and spiders (or other animals).

WHILE AT THE INSECT VILLAGE

As appropriate, encourage chaperones to lead discussions within their field trip groups about the following:
Adaptations help all living creatures survive. Insects and arthropods are highly adapted animals, which is one reason why they are so successful. By observing the animals in the live insect and arthropod zoos and by reading the posted information, what physical features and behaviors help these creatures survive? Here is a small list of examples to get you started, differentiating between physical features and behaviors:

Behaviors:

Black Widow spider: hiding in small cracks and crevices

Australian Prickly Stick insect: swaying back and forth in the breeze to mimic a leaf in the wind

Physical features:

Black Widow spider: possesses a venomous bite to ward off predators and paralyze prey

Australian Prickly Stick insect: highly specialized camouflage to elude predators

POST-VISIT DISCUSSION

- Review and amend any list you may have made of students' prior knowledge of insects, including the differences between other classes of animals such as spiders.
- Let each student make changes to, or draw a new picture of an insect, changing the labels as needed. Discuss their drawings.
- Go on a mini field trip outside to find and observe (without disturbing) insects. What behaviors do the students notice?
- An entomologist is a scientist who studies insects. Let students imagine that they are entomologists. What would they like to find out about insects and how would they go about finding out?

Essential Academic Learning Requirements (EALRs) for Washington state addressed in this flyer*:

EALR 4: Domains of Science: Life Science

Big Ideas:

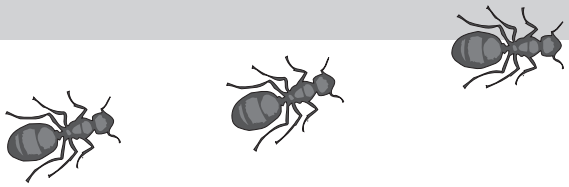
- Plants and animals have different structures that meet their needs and respond to the environment;
- Plants and animals have life cycles;
- Both plants and animals have different characteristics that can be used to classify them.

EALRs 1 & 2: Crosscutting concepts and abilities

Systems: Recognize that animals are made of parts and naming at least 5 of those parts.
Explain how different parts of an animal contribute to the whole

Inquiry: Ask and answer questions by making observations, or trying things out.

**To find out about EALRs addressed in the exhibit, please refer to the Insect Village EALR chart in your package.*



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

INSECT VILLAGE

STUDENT ACTIVITY SHEET

INSECT BRIEFING

INSECT INFORMATION

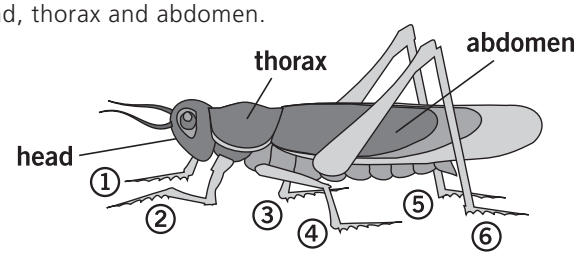
Feeling outnumbered?

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 animals 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 complete 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 incomplete metamorphosis.

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

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



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:

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How do you feel about eating insects?

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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?

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

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THINGS TO THINK ABOUT AND DO

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

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

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- 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?

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

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

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- 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.

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

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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.

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