

Attack of the Bloodsuckers! – A Guide for Teachers

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Oregon State Content Standards

Attack of the Bloodsuckers! introduces visitors to various *sanguivores* (animals that consume blood), their highly specialized adaptations for finding and consuming blood, and the roles that they play in the ecosystem. Kids will be able to witness live mosquitoes and leeches and make observations about their behaviors and life cycles. They can also see images of specimens from around the world, including photographs, magnified images, and prepared microscope slides. This is an excellent exhibit to complement units on evolution, adaptation, food chains/webs, ecosystems, and human health.

Some relevant standards are listed below. Those in **boldface** have an especially prominent place in the exhibition.

K.3S.1 Explore questions about living and non-living things and events in the natural world.

K.3S.2 Make observations about the natural world.

1.1L.1 Compare and contrast characteristics among individuals within one plant or animal group.

1.2L.1 Describe the basic needs of living things.

1.3S.1 Identify and use tools to make careful observations and answer questions about the natural world.

2.1L.1 Compare and contrast characteristics and behaviors of plants and animals and the environments where they live.

2.2L.1 Describe life cycles of living things.

2.3S.1 Observe, measure, and record properties of objects and substances using simple tools to gather data and extend the senses.

3.1L.1 Compare and contrast the characteristics of offspring and parents.

3.2L.1 Compare and contrast the life cycles of plants and animals.

4.2L.1 Describe the interactions of organisms and the environment where they live.

5.1L.1 Explain that organisms are composed of parts that function together to form a living system.

5.2L.1 Explain the interdependence of plants, animals, and environment, and how adaptation influences survival.

6.2L.2 Explain how individual organisms and populations in an ecosystem interact and how changes in populations are related to resources.

Before Your Visit

- Survey students in an informal discussion to discover what they know about bloodsucking animals. For example:

- Have you ever been bitten by a mosquito? What did it feel like? Why do you think the mosquito bit you?
- Have you seen or heard of leeches? What do leeches eat?
- What is blood? What is it made of? What color is it? Why? Do all animals have blood?
- For a literature connection, read the African folktale *Why Mosquitoes Buzz in People's Ears* (by Verna Aardema, available at amazon.com and many children's bookstores).
- Believe it or not, it is fairly easy to maintain your own colony of mosquitoes in your classroom. You can find mosquito life cycle kits from Carolina Biological Supply (<http://www.carolina.com/>) or create your own mosquito homes using a plastic tub or bottle covered with fine mesh screen or nylon stockings. Order mosquito eggs or larvae, or catch them yourself by searching in still water from mid-spring to mid-fall. The following mosquito care tips come from "Mosquitoes in the Classroom" by Frances J. Spray:
 - You will want to concentrate the larvae and pupae if they are in a large volume of water, such as a five gallon bucket. Fill a smaller, more manageable container (two liter soda bottles or milk cartons with the tops cut off work well) with some of the same water in which you already have your mosquitoes or use some aged water. Age tap water by letting it sit in an open container for a few days. This allows the chlorine to evaporate. Using a 1" x 2" piece of window screen, scoop up the wigglers and tumblers and transfer them to the smaller container. You can also pour the entire container through a fine meshed strainer. The larvae and pupae will be retained in the strainer and then can be transferred to a smaller container.
 - Mosquito larvae are easy to care for. They will eat flaked fish food or algae pellets that can be purchased from pet stores. Grind the flake food or algae between your fingers as you drop it into the container. Do not overfeed. A few flakes or one algae pellet will last a long time. Mosquitoes are larvae for one to three weeks.
 - Place the pupae in a separate container. Cut a piece of netting or nylon and secure it around the top of the container, using a rubber band. Do not add food because the pupae do not feed. Mosquitoes are pupae for one to three days. Watch the adults emerge from the pupal case. Construct a container that allows you to add pupae without removing the net from the top. This can be done by cutting a hole in the side of the container, above the water line. Keep the hole covered with tape. Pupae can be added through this port.
 - Adults are also easy to care for. After all adults have emerged, carefully pour the water out of the container. Slowly pour the water through the netting, making sure it does not come off. Feed the adults sugar water. Mix a few tablespoons of sugar with a half cup of water. Soak some cotton in the sugar water and place it on top of the netting. Both the male and female adults will feed from the sugar-soaked cotton. As the mosquitoes feed, you can observe their midguts filling with clear sugar water. Moisten

the cotton in the sugar water every two days or so. Adults will live for two weeks to a month. Release them outside or kill them by putting them in the freezer.

During Your Visit

Distribute our **scavenger hunts** (available on our website or at the front desk), or create your own field trip activity sheets, to ensure that students are getting the most out of the exhibits.

After Your Visit

- Review the major components of the exhibit. Let students reflect in writing or discussion: What did they learn about bloodsuckers that they did not know before? What surprised them about the exhibit?
- Talk about careers in entomology and related fields. See the profile of Mark Siddall, leech expert: <http://www.pbs.org/wgbh/nova/secretlife/scientists/mark-siddall/>
- Review facts about bloodsuckers by playing “Bloodsucker Trivia” (page 25 of <http://www.sciencenter.org/bloodsuckers/educators/d/Suckers%20Binder.pdf>; use the category cards at http://www.sciencenter.org/bloodsuckers/educators/d/bloodsucker_trivia_category_cards.doc and the question cards at http://www.sciencenter.org/bloodsuckers/educators/d/bloodsucker_trivia_point-question_cards.doc).
- Make engorged tick puppets using simple materials (page 11 of <http://www.sciencenter.org/bloodsuckers/educators/d/Suckers%20Binder.pdf>)

Useful Websites

“Attack of the Bloodsuckers!” Educator guide prepared by Sciencenter, Ithaca, NY:
<http://www.sciencenter.org/bloodsuckers/educators/programmaterials.asp>

“Neato Mosquito,” a 4th-grade lesson plan on mosquitoes and encephalitis prepared by the Centers for Disease Control:
<http://www.cdc.gov/ncidod/dvbid/Arbor/neato.htm>

Clackamas County Vector Control “Mosquito School” lesson plans:
<http://www.clackamas.us/vector/education.jsp>

How Mosquitoes Work:
<http://science.howstuffworks.com/environmental/life/zoology/insects-arachnids/mosquito.htm>