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HMNS Outreach: Bugs on Wheels

Awesome Arachnids

Grades 6-8

Dear Educator,

Thank you for choosing to include HMNS' Outreach Programs in your educational toolkit! We are thrilled to have the opportunity to visit your campus with our Bugs on Wheels program, and we want to ensure that you are completely prepared.

Here at HMNS our mission has always been to provide exemplary educational opportunities for the community. Providing educators like you with free, fully editable curriculum is just one of many ways we are fulfilling that mission.

Thank you again, and we hope you enjoy your HMNS Outreach Program!

Best,

The HMNS Staff

How to use this guide:

1. Feel free to edit the questions and activities as needed to suit your student group.
2. The curriculum is split into two distinct sections: Pre-Show Activities and Post-Show Enrichment Activities.
3. Each guide includes an Appendix with relevant resources, handouts, and links.

Please direct any and all questions to either outreach@hmns.org or curriculum@hmns.org





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Grades 6-8 TEKS Objectives

Each activity within this guide is designed to meet a variety of Life Science Texas Essential Knowledge and Skills Objectives.

6th Grade

6.12D	Identify the basic characteristics of organisms, including prokaryotic or eukaryotic, unicellular or multicellular, autotrophic or heterotrophic, and mode of reproduction, that further classify them in the currently recognized Kingdoms.
6.12E	Describe biotic and abiotic parts of an ecosystem in which organisms interact.
6.12F	Diagram the levels of organization within an ecosystem, including organism, population, community, and ecosystem.

7th Grade

7.10B	Describe how biodiversity contributes to the sustainability of an ecosystem.
7.11A	Examine organisms or their structures such as insects or leaves and use dichotomous keys for identification.
7.11B	Explain variation within a population or species by comparing external features, behaviors, or physiology of organisms that enhance their survival such as migration, hibernation, or storage of food in a bulb.
7.12A	Investigate and explain how internal structures of organisms have adaptations that allow specific functions such as gills in fish, hollow bones in birds, or xylem in plants
7.13A	Investigate how organisms respond to external stimuli found in the environment such as phototropism and fight or flight.
7.14A	Define heredity as the passage of genetic instructions from one generation to the next generation.

8th Grade

8.11A	Describe producer/consumer, predator/prey, and parasite/host relationships as they occur in food webs within marine, freshwater, and terrestrial ecosystems.
8.11B	Investigate how organisms and populations in an ecosystem depend on and may compete for biotic and abiotic factors such as quantity of light, water, range of



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	temperatures, or soil composition.
8.11C	Explore how short- and long-term environmental changes affect organisms and traits in subsequent populations.

Vocabulary

The following concepts will be discussed either during the Outreach presentation or within the activities provided.

adaptation, appendix, arachnid, arthropod, camouflage, cephalothorax, classification, consumer, dichotomous key, ecosystem, genus, heredity, instinct, invertebrate, kingdom, niche, population, producer, scorpion, specialization, species, symmetry, taxonomy

Pre-Show Activity

Introduction to Arachnids

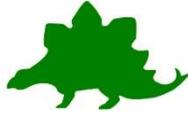
Materials: Internet access or scientific books on arachnids

Procedure:

1. Begin by posting the following question on the board: “What are the defining characteristics of arachnids?”
2. Give students a few minutes to write down everything they know about arachnids. Then, allow them to partner up and discuss.
3. As a class, come up with a working definition of “arachnid” that they will use to focus their activity.
4. Provide students with the following scenario: They are scientists who have been approached with solving an insect crisis in Texas. All throughout the state insect populations are reaching new highs, and are wreaking havoc on plant populations. Scientists have been tasked with developing a new breed of arachnid that will help curb this problem. A different arachnid must be developed for each major ecological niche within the state of Texas. The arachnid must be able to defend itself, contribute to lowering the insect population without decimating it entirely, be able to reproduce effectively, and also be a suitable prey animal for those higher on the food web than them.

Note: This activity may be conducted individually, in pairs, or in groups.

5. Assign each student scientist one of the following biomes of Texas: Piney Woods, Oak Motte, Coastal Prairie and Wetlands, South Texas Dry Forest, Guadalupe Mountains, High Plains.



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6. Student scientist pairs must research their biome and create an arachnid that is adapted to live in its environment. They will make a model of their arachnid (either digitally or out of available craft supplies) and prepare a brief presentation explaining how it fits into the ecological niche and how it will help curb insect populations.

Extension: Teachers may assign students to serve on a panel that the student scientists will be presenting to. Panel members will pose questions about the adaptability of the new arachnid species, its traits, and its ability to solve the insect problem. Student scientists should be prepared to field questions.



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Post-Show Enrichment Activities

Insect or Arachnid?

Materials: Dichotomous key samples, internet access

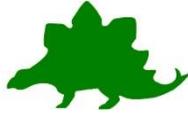
Procedure:

1. Find several different examples of dichotomous keys online to show your students. Explain to them that the key is a method of identification, and they will be creating their own.
2. Have students research a variety of arthropods, including arachnids and non-arachnids, and choose ten different species. Encourage students to be specific with the animals they select. For example, they can choose several varieties of spider (black widow, tarantula, etc.). Once selected, students will print or draw the animals chosen.
3. Students will create a dichotomous key that will lead to the correct identification of each of these arthropods.
4. Once finished, have students or student pairs exchange keys and pictures to see if they can correctly identify the arthropods referenced in the key.

Environmental Hazards

Procedure:

1. While arachnids are well-adapted for their surroundings, they are often faced with unexpected challenges. Tell students that they are going to pretend to be a brown recluse spider living in Hill Country.
2. Split students into groups and assign each group one of the following scenarios:
 - a. Forest fire
 - b. Drought conditions
 - c. Flash flood
 - d. Housing development built
 - e. New invasive bird species (predator) introduced into the environment
3. Students will write a short story book detailing how their brown recluse adapts to the change in its environment.



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Arachnid Food Web

Materials: Butcher paper, markers, colored pencils

Procedure:

1. Have students choose their favorite arachnid from the HMNS presentation.
2. Tell students that they are going to be creating a food web for their arachnid. They must include producers and consumers, and the web must be appropriate to the arachnid's natural habitat. Allow students to use the internet or resource books to research their arachnid.
3. Students will use blank butcher paper to draw their food web. Each item on the web should contain the following:
 - a. Whether the animal is a producer or consumer
 - i. If the animal is a consumer, where it falls in the web (primary consumer, secondary consumer, etc.)
 - b. Whether the animal is a predator, a prey animal, or both
 - c. Whether the animal is an herbivore, carnivore, or omnivore