

INVERTEBRATES

THIRD - FIFTH

Life Science TEKS

<i>Third Grade:</i>	3.9A, 3.9B, 3.10A, 3.10C
<i>Fourth Grade:</i>	4.9A, 4.9B, 4.10A, 4.10C
<i>Fifth Grade:</i>	5.9A, 5.9B, 5.10A, 5.10B, 5.10C

Vocabulary

adaptation, annelids, arachnid, arthropod, centipede, cnidarians, compost, crustacean, echinoderm, insect, invertebrate, life cycle, millipede, mollusks, porifera, trait

Pre-Show Activity

Pre-Show Lesson: Invertebrates

Post this question on the board: “Ninety percent of all animals are invertebrates; what do you know about them?”

Materials:

Per class: copy of Appendix A-1 (labels for centers), if possible, examples for each of the following invertebrate groups (mollusks, echinoderms, jellyfish, sponges, annelids, arachnids, crustaceans)

Per student: copy of Appendix A-2

Procedure:

1. Set up seven centers, one for each invertebrate group. Depending on the level of your students, you may want to have fewer centers (mollusks, echinoderms, jellyfish, sponges, annelids, arachnids, crustaceans). Each center should have samples of the invertebrate listed. The best option is to get preserved samples at Science Education Supply Store or to purchase live samples. Crayfish can be purchased at grocery stores and worms at bait stores. Snails can usually be found in gardens. A second option is to get plastic creatures from stores that sell plastic animals, such as party stores or toy

stores. The final option is to have assorted pictures or just use the title pages with pictures in Appendix A-1. There are pictures on the title page for each center with links for more information.

Teacher Information:

Invertebrates are animals without a backbone. Of the planet's estimated 15-30 million animal species, 90% or more are invertebrates. Invertebrates live just about anywhere. They have been recorded in the upper reaches of the atmosphere, in the driest of deserts and in the canopies of the wettest rainforests. They can even be found in the frozen Antarctic or on the deepest ocean floor.

Source: Australian Museum

2. Students will rotate through the seven centers in groups, observing the invertebrates and filling out the chart in Appendix A-2.
3. Debrief with the class. Discuss what they learned about invertebrates. Read a book about invertebrates to review and elaborate on what students have learned. Some possible books are:
 - *Classifying Invertebrates (Classifying Living Things)* by Francine Galko
 - *Animals Without Backbones (Big Science Ideas)* by Bobbie Kalman
4. Optional Activities:
 - Compare and contrast two or three different invertebrates in a Venn diagram.
 - Students will create a food chain for an invertebrate. They can use the website <http://animals.nationalgeographic.com/animals> to help them.
 - Classifying invertebrates, you can find invertebrate cards at <http://www-tc.pbs.org/kcet/shapeoflife/resources/activity4.pdf>.
 - Use a dichotomous key to identify invertebrates. Find this activity at <http://www.usc.edu/org/seagrant/Education/IELessons/Docs/CrittersClassifiedOnline.pdf>.

Post-Show Enrichment Activities

Activity One: Vertebrates and Invertebrates

Materials: *Chickens Aren't the Only Ones* by Ruth Heller

Procedure:

1. Students will make a T-chart of their paper. They will label one side "Vertebrates" and the other "Invertebrates".
2. Read, *Chickens Aren't the Only Ones* by Ruth Heller.
3. As you read, students will place the animals in the chart according to vertebrate or invertebrate. Students will note that there are both vertebrates and invertebrates that lay eggs.
4. Students will chose an invertebrate and a vertebrate and compare their life cycles. They will share their results in a chart or diagram.

Activity Two: Worms Eat Our Garbage

Materials: earthworms, compost, plastic shoe box with holes in lid, organic and inorganic material, spray bottles

Procedure:

1. Students will observe the earthworms and make note of their findings in their science notebooks. They will note all body parts and infer their purpose. This can be done in a simple T-chart.
2. Students will do some informal testing of earthworms. In groups they will chose a problem and make a hypothesis. They will design an experiment to test their hypothesis, record results and make a conclusion in their science notebook.

Possible experiments:

- Do worms prefer light or dark environments?
- Do worms prefer rough or smooth surfaces?
- Do worms prefer warm or cold surfaces?
- Do worms prefer moist or dry surfaces?

3. Students could also set up an experiment to see if organic or inorganic waste is decomposed faster by worms. Put all of the worms into a plastic container of compost. Bury some organic objects (fruits, vegetables, newspaper, and wood). Also bury some inorganic objects that are about the same size (plastic, metal paperclip and a rock). Cover the container with a towel around the outside to help keep it dark inside. Make sure there are holes in the lid and place it back on the container. Check the experiment every other day to make sure the soil is staying moist. You may want to put a layer of torn newspaper strips that are moistened on top of the soil. If the soil is getting dry, mist it with a water bottle. After a couple weeks, check your results.

Allow students to bring their own objects from home to test.

A great resource book for composting in the classroom is: *Worms Eat Our Garbage: Classroom Activities for a Better Environment* by Mary Appelhof, Mary F. Fenton, Barbara L. Harris

Activity Three: Arthropods

Materials: arthropod book (*What Is an Arthropod? (Science of Living Things)* by Kathryn Smithyman and Bobbie Kalman or *Dirty Rotten Bugs: Arthropods Unite to Tell Their Side of the Story* by Gilles Bonotaux), arthropod pictures (Appendix A-3), arthropod chart (Appendix A-4)

Procedure:

1. Explain to students that there are actually five different major groups of arthropods. The groups are: insects, arachnids, crustaceans, centipedes and millipedes. Give students a picture of each one (Appendix A-3). Have them examine the pictures and compare them. In groups, students will need to create some kind of a chart, table or diagram in which they compare and contrast the five arthropod groups. How are they all alike? How are some groups alike? How are they different? Groups should try to come up with a definition of what an arthropod is by looking at the ways all of the examples are alike.
2. Read a book to the students about arthropods. Students will listen to see if their ideas were correct. You may also want students to create an arthropod chart and take notes as you read (Appendix A-4).

Appendix

A-1

Cnidarians



Organ Pipe Coral



Cavernous Star Coral

<http://animals.nationalgeographic.com/animals/photos/corals/>



The millions of golden jellyfish that pack Palau's Jellyfish Lake spend much of their lives on the move during a daily migration that follows the sun's arc across the sky.

Mollusks



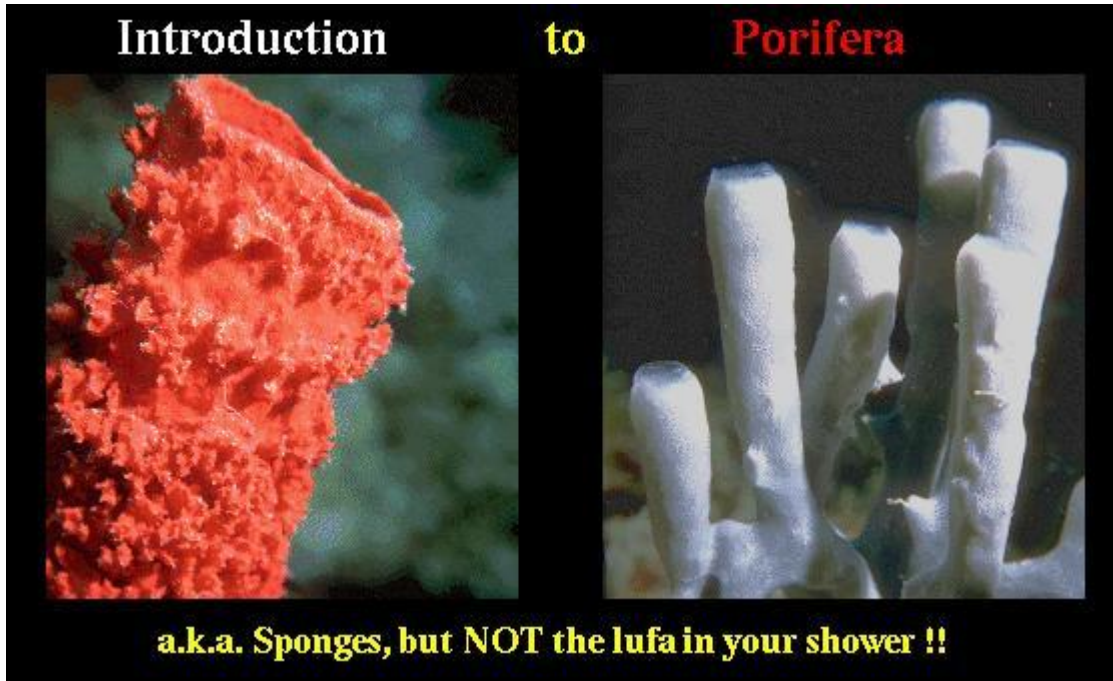
Octopus



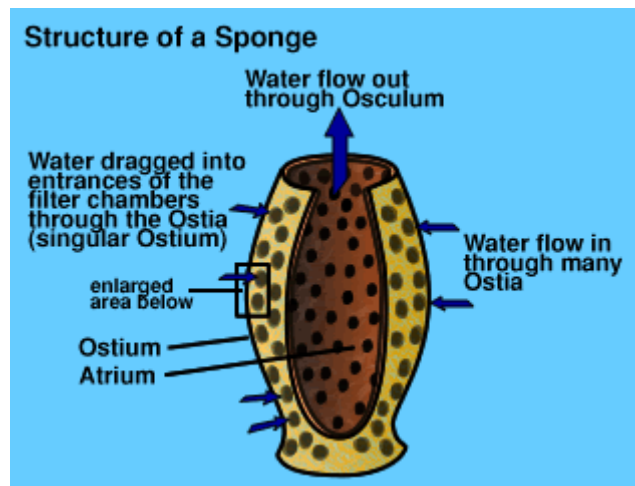
The most deadly of the nearly 500 species of cone snails, the geographic cone's intricately patterned shell is coveted by collectors.

<http://animals.nationalgeographic.com/animals/invertebrates/common-octopus/>

Porifera



<http://www.ucmp.berkeley.edu/porifera/porifera.html>



<http://www.mesa.edu.au/porifera/porifera01.asp>

Echinoderms



Sea stars are purely marine animals, even using sea water instead of blood to pump nutrients throughout their bodies.



All sea cucumbers are ocean-dwellers, though some inhabit the shallows and others live in the deep ocean.

<http://animals.nationalgeographic.com/animals/invertebrates/sea-cucumber/?source=A-to-Z>

Annelids



Earthworms' bodies are made up of ring-like segments called annuli. The annuli are covered in small hairs that help in moving and burrowing.

<http://animals.nationalgeographic.com/animals/invertebrates/earthworm/?source=A-to-Z>

Leeches



Source: biologyofanimals.blogspot.com

Arachnids



Notorious for their bloodthirsty courtship, black widow spiders are identified by the colored markings on their black bodies.



The tarantula's appearance is worse than its bite. Tarantula venom is weaker than that of a honeybee and, though painful, is virtually harmless to humans.

<http://animals.nationalgeographic.com/animals/bugs/tarantula/?source=A-to-Z>

Crustaceans



Blue crabs

<http://animals.nationalgeographic.com/animals/invertebrates/blue-crab/?source=A-to-Z>



Shrimp

Source: io9.com



Closely related to crabs and shrimp, this ten-legged crustacean has become a delicacy over time as overfishing of commercially important lobster species chips away at the global population.

<http://animals.nationalgeographic.com/animals/invertebrates/lobster/?source=A-to-Z>

A-2

Name _____

Date _____

Invertebrates

Directions: Observe the specimens at each invertebrate center and record your observations below.

	Name and Drawing of Organism	External observations: (body type, legs, body segments, tentacles, head, eyes, body shape)	Explain one adaptation and how it helps this organism survive in its habitat.
Porifera (sponges)			
Echinoderms (spiny skin)			

Mollusks (snails, slugs, squids and octopuses)			
Cnidarians (Jellyfish, corals, and sea anemones)			
Annelids (segmented worms)			

Arachnids			
Crustaceans			



Insects



Arachnids



Crustacean



Millipedes



Centipedes

All pictures are taken from Wikipedia.

A-4 Name _____

Date _____

Invertebrates

Invertebrate Groups:	Examples	Traits
Crustaceans		
Arthropods		
Insects		
Millipedes		
Centipedes		

What do all arthropods have in common?