

**Activity: Where's Your Backbone?**

**Grade Level:** Grade 2

**Major Emphasis:** Invertebrates

**Major Curriculum Area:** Science

**Related Curriculum Areas:**

Refer to Outdoor Education Curriculum Matrix K-2

Language Arts

Career Education

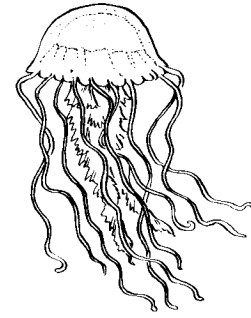
Human Relations

Physical Education

Social Studies

Mathematics

Art



**Program Indicator:**

The student will be able to identify characteristics of invertebrates in terms of adaptation to the environment.

**Student Outcomes:** The student will:

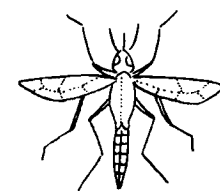
1. collect and identify a variety of invertebrates using nets and traps.
2. observe and identify environmental adaptations of invertebrates.
3. classify invertebrates by class using a graphic organizer.

**Readiness:**

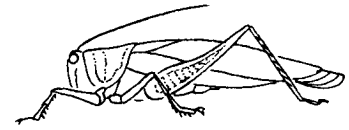
1. Selected activities from the second grade Unified Science Curriculum, "Vertebrates and Invertebrates."
2. Introduce vocabulary:

abdomen	crab pot	locomotion	shrimp	jellyfish	invertebrate
arthropod	crustacean	mollusk	spider	crab	prey
backbone	exoskeleton	oyster	thorax	segmented	worm
carapace	habitat	predator	tongs	coelenterate	

3. Discuss the difference between invertebrates and vertebrates.
4. Introduce animals through picture cards or study prints.
5. Discuss adaptation to the environment, including:
  - a. body parts of insects.
  - b. how senses are used for protection.
  - c. types and uses of protective devices.
  - d. types of locomotion.



6. Select and view films available from the Anne Arundel County Board of Education's Media Services.
  - a. Film 652: "A First Film on Insects"
  - b. Film 6297: "Insect Metamorphosis"
  - c. Film 7040: "Life Cycle Insects"
  - d. Film 85: "Caterpillars Grow and Change"
  - e. Film 1141: "Jumpy the Grasshopper"
  - f. Film 304: "Life Story of an Earthworm"
  - g. Film 982: "Butterfly"
  - h. Film 1112: "Animal Behavior"
  - i. Film 951: "Animals Move in Many Ways"



**Materials:**

*Depending upon the season of the year, it may also be necessary to obtain specimens of oysters, crabs, shrimp and clams.*

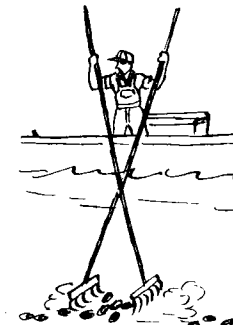
Supplements A-H	dip net	tongs	oyster diagram
berlese funnels	seine net	sweep net	hand lenses/magnifiers
crab pot	waders	trowels	crayons or pencils
sample trays	sifting screens	clipboards	personal flotation devices (PFDs)

**Procedures: (DL2,3&4)**

1. Divide students into four groups. The ideal group is 4 to 6 students per station. For small numbers of students, 3 groups may be used and the grassy area deleted.
2. Each group should start at one of four different sites (pier, shoreline, open grassy area and wooded area) and rotate to each site. A minimum of 20 minutes should be allowed at each station.
3. General procedures at each location:
  - a. *Collect* the organisms.
  - b. *Observe* with hand lenses/magnifiers.
  - c. *Guide* discussion of organisms with interview questions. Refer to Supplement A.
  - d. *Return* the organism to its habitat.

**Activity A: Pier (Every student will wear a PFD at all times.)**

1. Oysters
  - a. Use oyster tongs to bring oysters up from the bottom. *A basket of oysters should be available.*
  - b. Observe outer shell, shape and texture.
  - c. Observe sample oyster (opened).
  - d. Discuss locomotion and protective devices.
2. Crabs
  - a. Pull up crab pot with crabs in it.
  - b. Observe outer shell, shape and texture.
  - c. Discuss locomotion and protective devices.

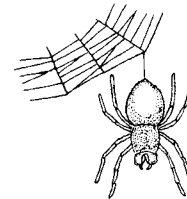


### Activity B: Shoreline

1. Clams
  - a. Dig clams from shallow, muddy area.
  - b. Observe outer shell, shape and texture.
  - c. Discuss locomotion and protective devices.
2. Shrimp
  - a. Use dip nets to collect shrimp.
  - b. Observe outer shell, shape, texture and segmentation.
  - c. Discuss locomotion and protective devices.
3. Jelly fish
  - a. Use dip nets to collect jellyfish.
  - b. Observe lack of outer shell, shape and texture.
  - c. Discuss locomotion and protective devices.
4. Adults may use a large seine net to collect live specimens. Refer to Supplement I.

### Activity C: Open Grassy Area

1. Insects
  - a. Use sweep nets to collect insects; dump into sample trays.
  - b. Observe locomotion.
  - c. Observe body parts (head, abdomen, thorax).
  - d. Observe number of legs (6).
  - e. Discuss protective devices.
2. Spiders
  - a. Use sweep nets to collect spiders; dump into sample trays (May be from the same sweep used to collect the insects).
  - b. Observe locomotion.
  - c. Observe body parts (thorax and abdomen).
  - d. Observe number of legs (8).
  - e. Discuss protective devices.



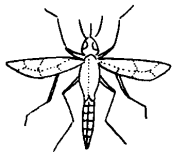
### Activity D: Wooded Area

1. Worms
  - a. Use trowels or small shovels to dig for worms.
  - b. Use sifting screens or berlese funnel to remove soil.
  - c. Observe lack of outer shell.
  - d. Observe animal shape, texture and segmentation.
  - e. Discuss protective devices.
2. Insects
  - a. Observe insects under rocks and in or under forest debris.
  - b. Observe locomotion.
  - c. Observe body parts (head, abdomen, thorax).
  - d. Observe number of legs (6).
  - e. Discuss protective devices.

2. Spiders
  - a. Observe spiders under rocks, in/on/under debris and webs strung between plants.
  - b. Observe locomotion.
  - c. Observe body parts (thorax and abdomen).
  - d. Observe number of legs (8).
  - e. Discuss protective devices.

**Activity E: Resource Lab (Inclement Weather Option)**

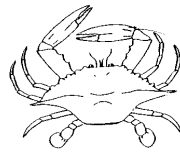
1. Observe bee tree and preserved specimens.
2. Observe and/or discuss locomotion.
3. Observe body parts (head, abdomen, thorax).
4. Observe number of legs.
5. Discuss protective devices.



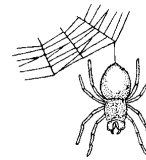
Insect



Worm



Crab



Spider



Shrimp



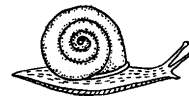
Jellyfish



Oyster



Barnacle



Snail



Clam

**Figure 1: Examples of Invertebrates**

**Summary: (DL3)**

1. Play a game matching pictures of invertebrates to their classification. Refer to Supplements B1 and B2.

**Follow-Up: (DL3)**

1. Make a class invertebrate booklet.
  - a. Draw and name an invertebrate.
  - b. Describe its food, locomotion, habitat and defense mechanisms.
  - c. Write a story: If I could be an invertebrate, I would be a \_\_\_\_\_ because \_\_\_\_\_.
2. Visit the Insect Zoo at the Smithsonian Institution.
3. Find invertebrates in your school yard and determine their class.

### Extension Activities:

1. Have students select an invertebrate and write a report.
2. Refer to NatureScope: Wading into Wetlands:
  - a. "Make a Mud Snail," p. 21.
  - b. "Spicy Shrimp Dip," p. 51.
3. Refer to NatureScope: Incredible Insects Discovery Pac.
4. Read Eric Carle Books.
5. Read Ranger Rick, January, 1995, "Extra Cheese and Bugs to Go!" (MC)
6. Set up and observe a worm composting box.

### Teacher Resources:

#### Books:

- < \*Chadwick the Crab, Cummings, Priscilla.
- < \*Home for a Hermit Crab, Carle, Eric.
- < \*Insects, Hutchins. 595.7.
- < \*Insects, The, Lanham. 595.7.
- < \*Invertebrates, Carter. 592.
- < \*NatureScope: Incredible Insects, National Wildlife Federation.
- < \*NatureScope: Wading into Wetlands, National Wildlife Federation.
- < \*Spiders and Their Kin, Levi. 595.4.
- < \*Understanding the Chesapeake, Sherwood. 917.52.

#### Filmloops:

- < \*"Clam." 594.
- < \*"Collecting Insects: Butterfly Net." 595.7.
- < \*"Crabs." 595.
- < \*"Jellyfish: Structural Diversity and Locomotion." 593.

#### Filmstrip/Kits:

- < \*"Developing Basic Skills: What Do You See?" EBE Corp, 612.
- < \*"Insects Around Us," Clearvue, Inc. 595.7.

#### Slides:

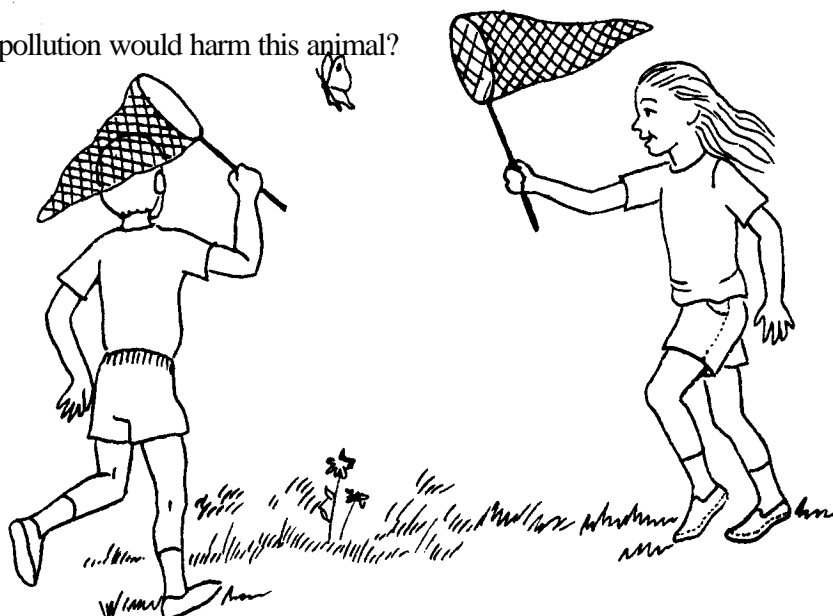
- < \*"Animals Without Backbones." 593.
- < \*"Oyster." 594.

#### Supplementary Materials:

- < "Invertebrate Facts." Supplement C.

## Invertebrate Interview

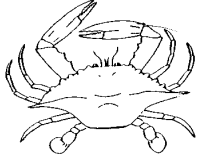
1. How does this animal move?
2. In what way does this animal get food?
3. Where does this animal make its home?
4. Does this animal have a backbone?
5. Is this animal a vertebrate or invertebrate?
6. Is this animal a predator or prey, or both?
7. Why is this animal important to us?
8. How might his animal be a problem for people?
9. What problem might humans create for this animal?
10. What kinds of pollution would harm this animal?



## Invertebrate Matching Game Student Copy

Draw a line between the animal and its classification.

**Crab**



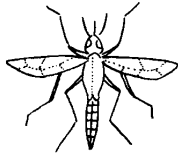
**Oyster**



**Clam**



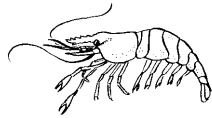
**Insect**



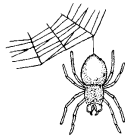
**Earth Worm**



**Shrimp**



**Spider**



**Jellyfish**



**Arthropods**

- ◆ **jointed legs**
- ◆ **hard exoskeleton**

**Annelids**

- ◆ **segmented body**

**Mollusks**

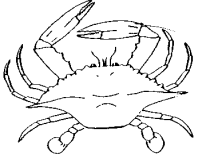


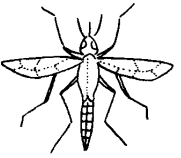
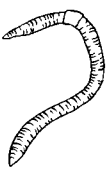
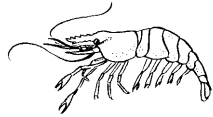
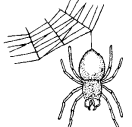

- ◆ **soft body**
- ◆ **usually has shell**

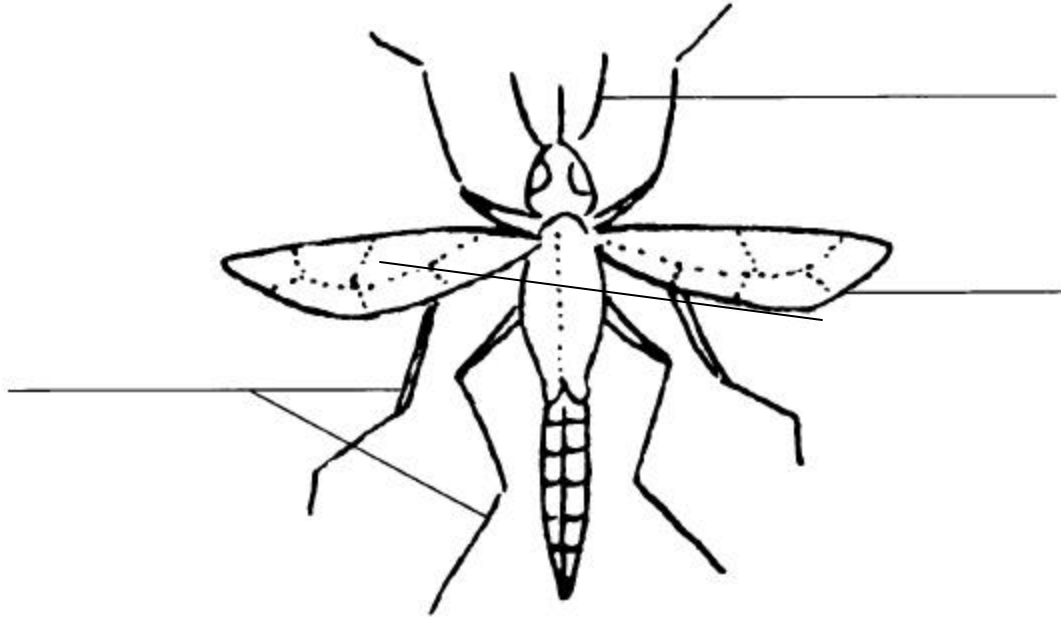
**Coelenterates**

- ◆ **soft body with no shell**
- ◆ **unsegmented**

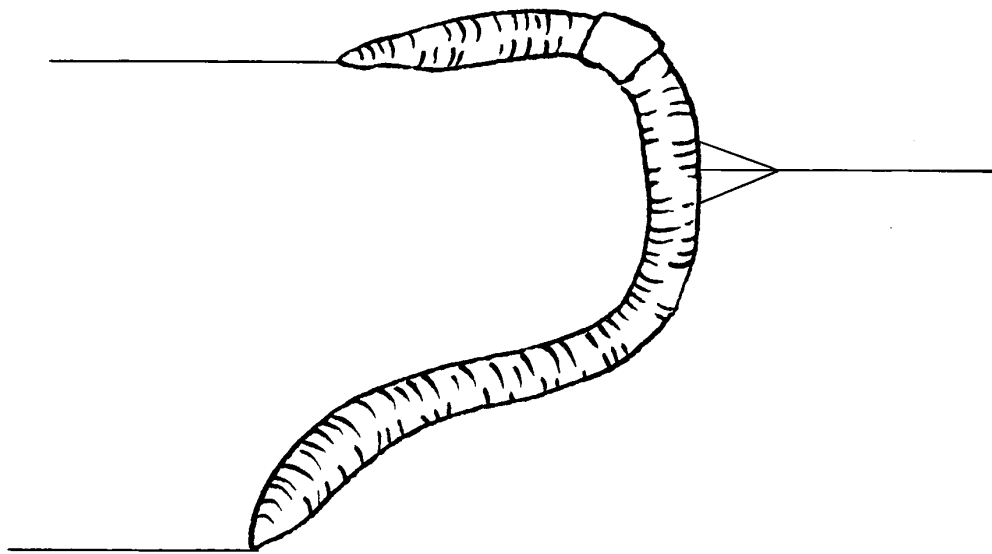
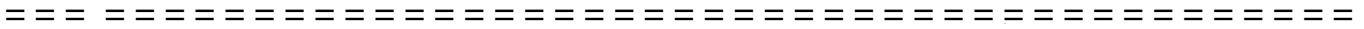
# Invertebrate Matching Game Teacher's Copy

Draw a line between the animal and its classification.

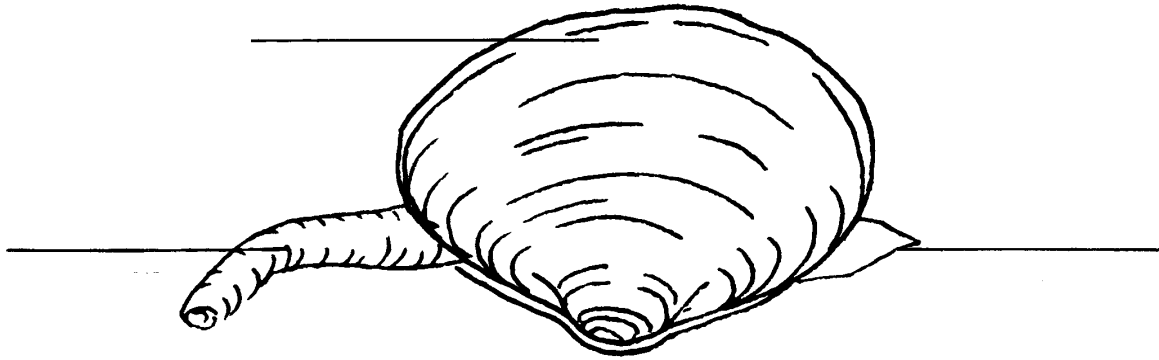
<b>Crab</b>		<b>Arthropods</b> ◆ jointed legs ◆ hard exoskeleton
<b>Oyster</b>		
<b>Clam</b>		<b>Annelids</b> ◆ segmented body
<b>Insect</b>		
<b>Earth Worm</b>		<b>Mollusks</b> ◆ soft body ◆ usually has shell
<b>Shrimp</b>		
<b>Spider</b>		<b>Coelenterates</b> ◆ soft body with no shell ◆ unsegmented
<b>Jellyfish</b>		



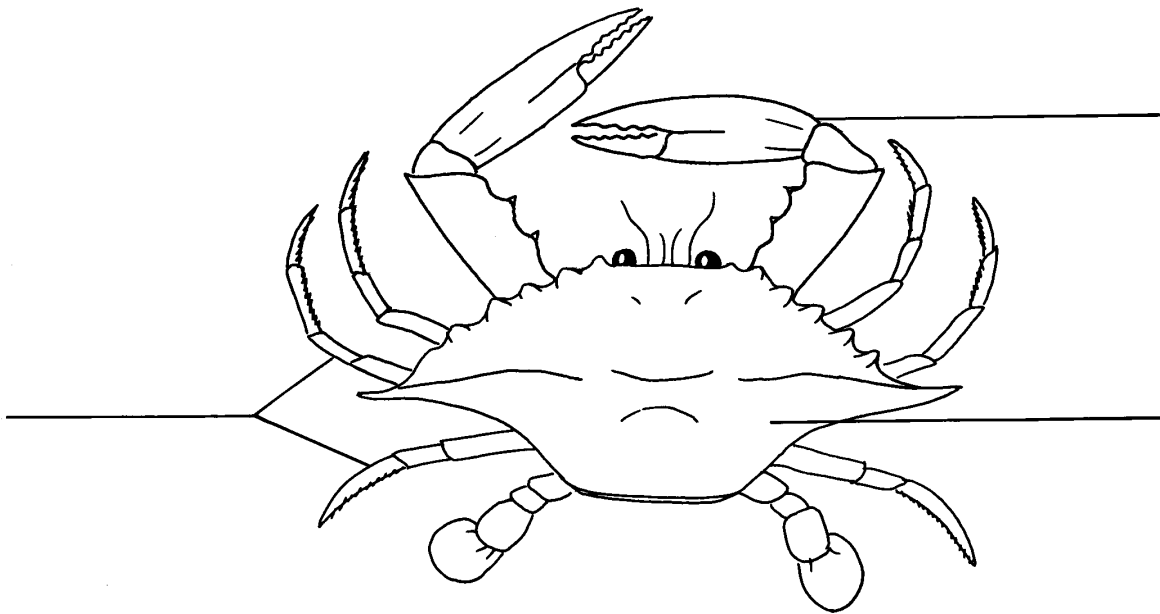
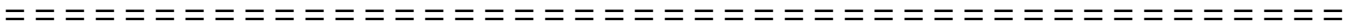
**Insect**



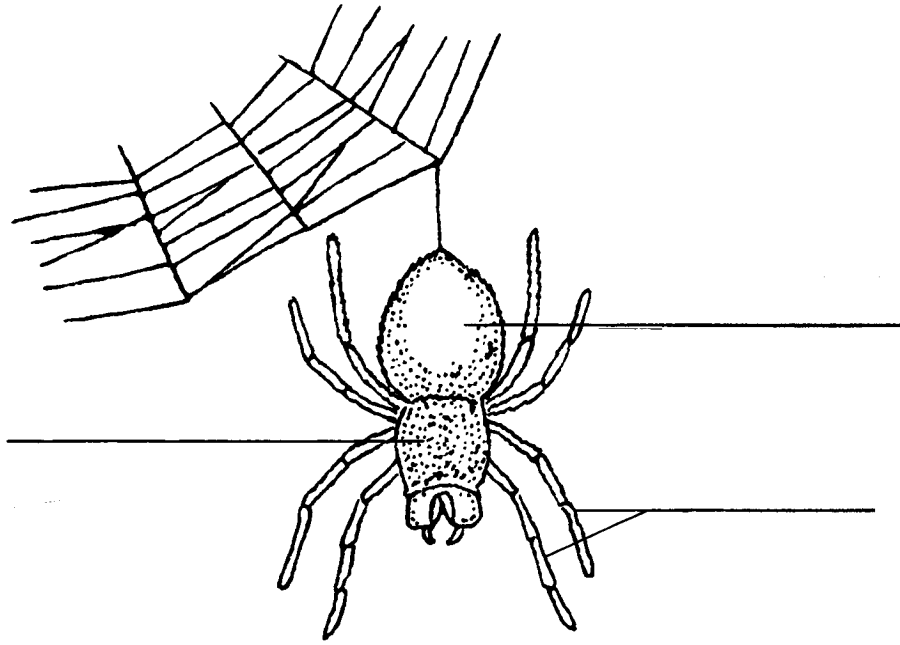
**Worm**



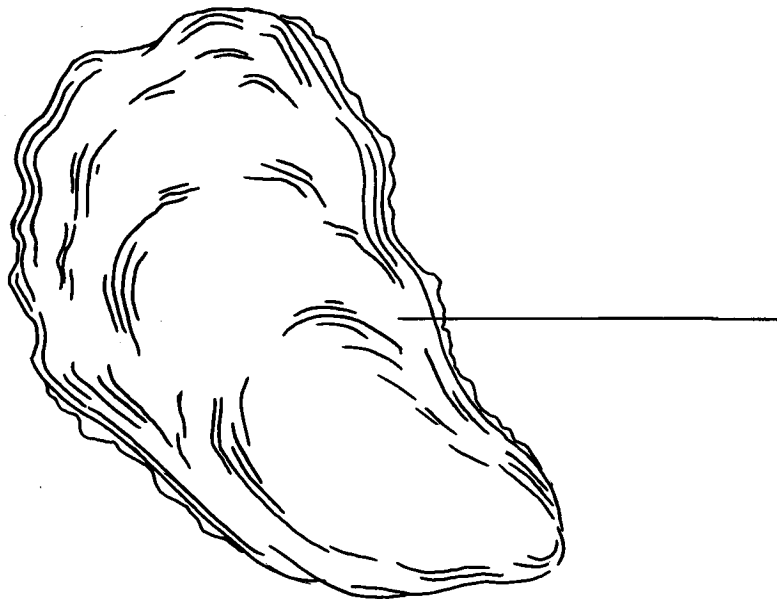
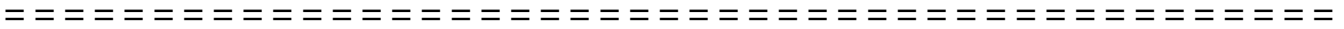
**Clam**



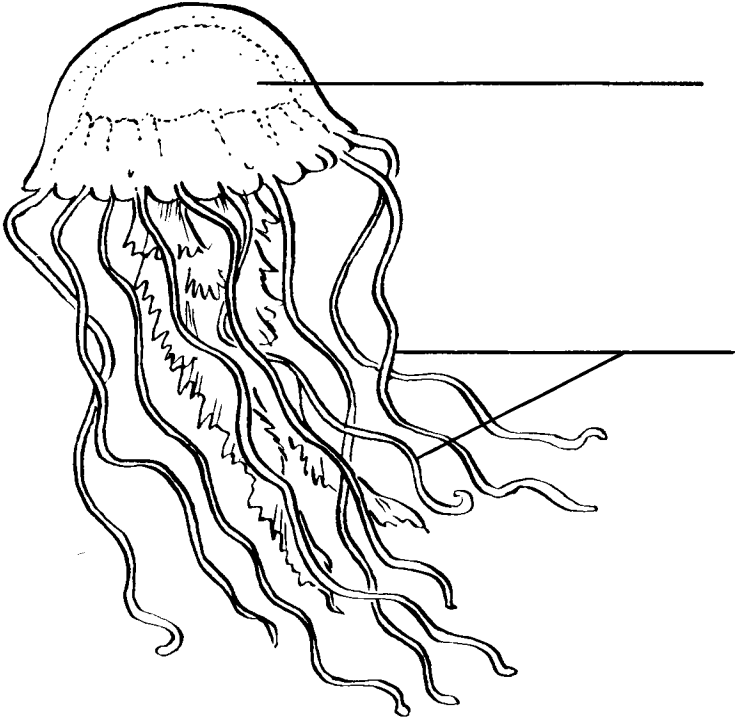
**Crab**



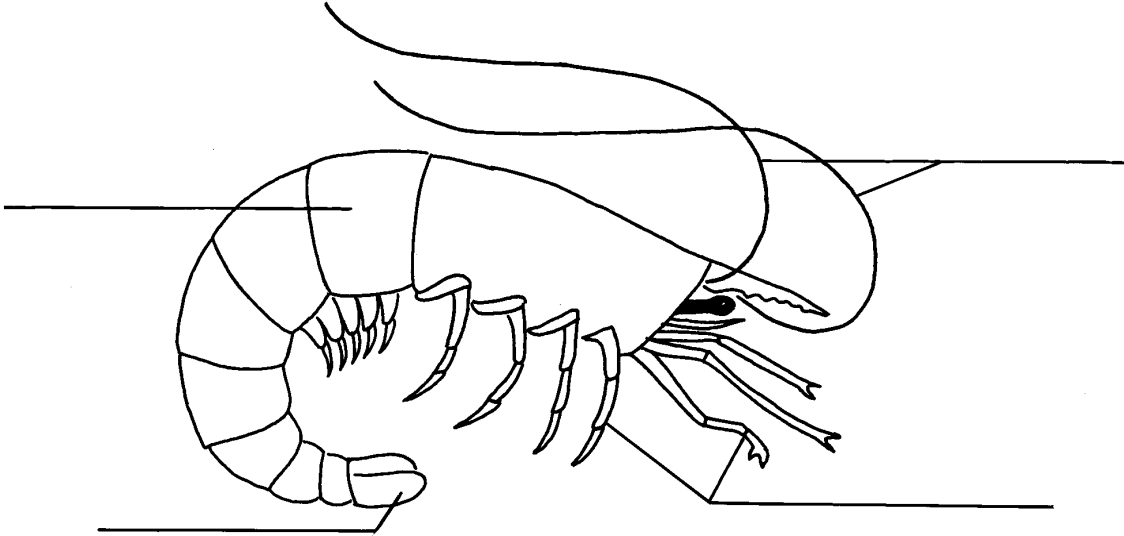
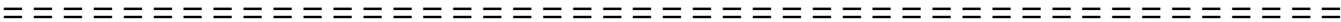
**Spider**



**Oyster**



**Jellyfish**



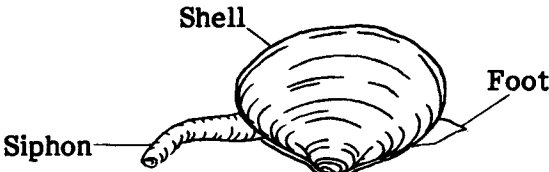
**Shrimp**

Parts of Invertebrates  
Teacher's Copy

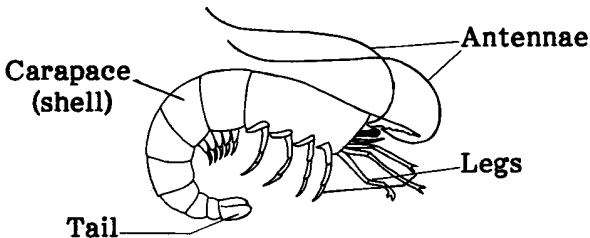
Oyster



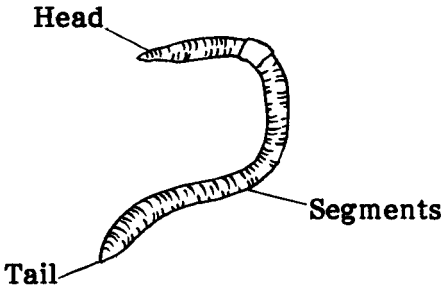
Clam



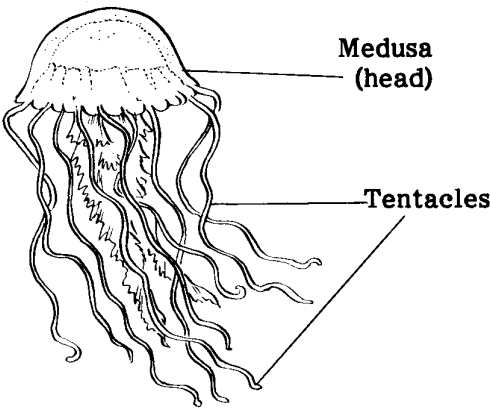
Shrimp



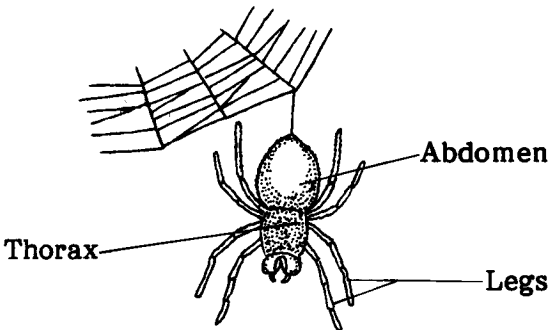
Worm



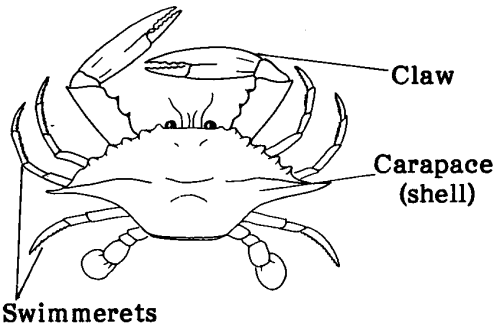
Jellyfish



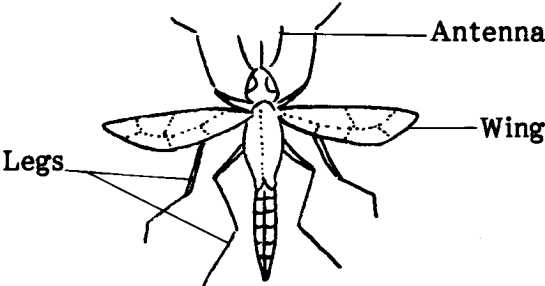
Spider



Crab



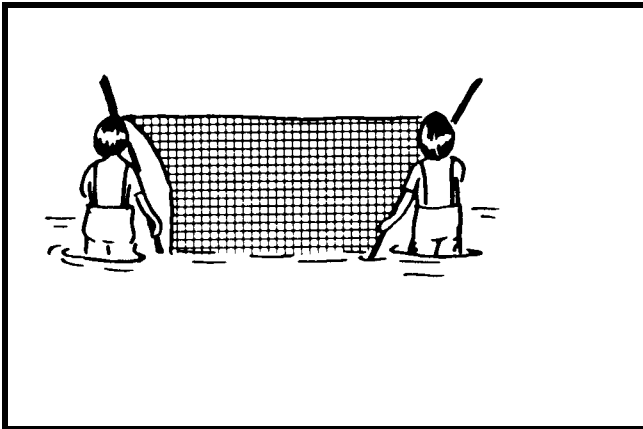
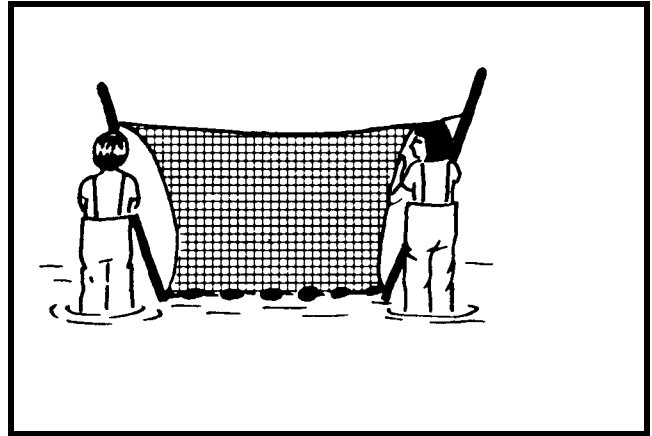
Insect



## Seining Procedures for Adults

### Step 1

Two adults carefully unroll the seine net so the weighted side is in contact with the river bottom.

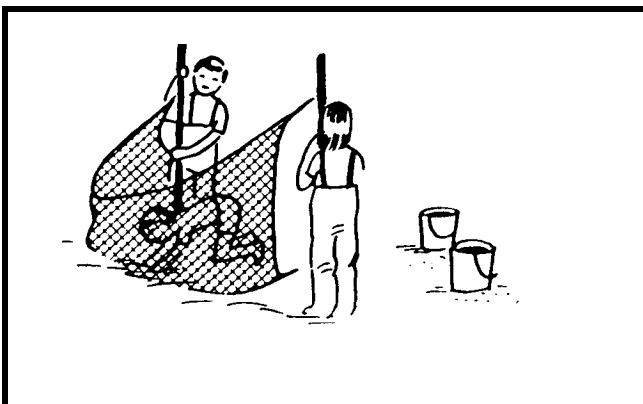
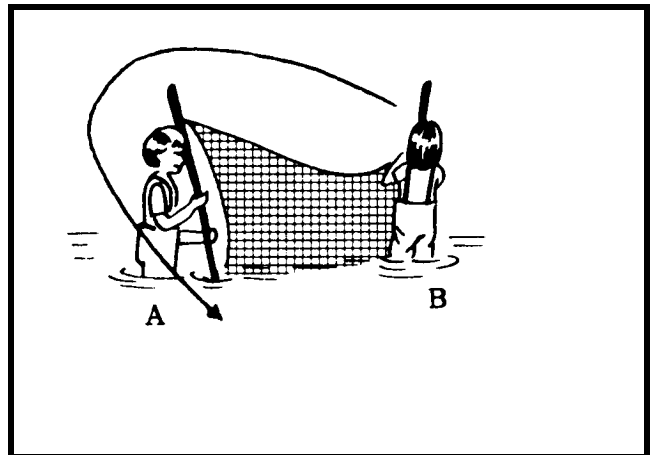


### Step 2:

Adults walk out to hip-deep water, bumping poles along the bottom, and tilting poles about 30° toward themselves.

### Step 3:

While adult A stands still, adult B will walk in an arc around adult A, still bumping the pole on the bottom, until both are facing shore.



### Step 4:

The adults walk slowly to shore, keeping the weights on the river bottom. As they reach the shore, a third adult grabs the net bottom so as not to lose collected animals.

