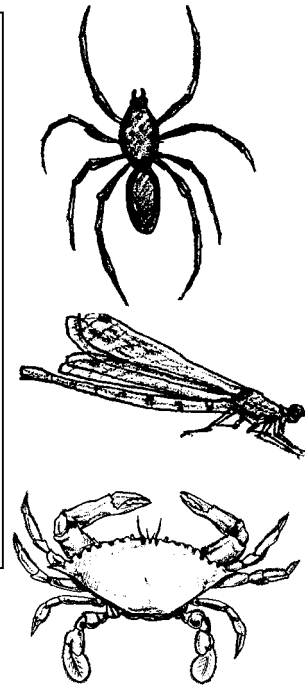


The Jointed-Foot Animals—Arthropoda

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Key Concepts

1. Arthropoda is a large and diverse phylum which includes animals found on land and in the water.
2. Scientists classify most marine arthropods in the class Crustacea. A few marine species are arachnids (spiders).
3. Arthropods are characterized by an articulated (jointed) exoskeleton, paired appendages, and a segmented body consisting of head, thorax and abdomen.



Background

The phylum Arthropoda contains more species of animals than all the other phyla combined. The fact that all marine representatives of this phylum come from the class Crustacea is somewhat of a help to the marine taxonomist. However, the 25,000 or so known crustaceans still present a formidable learning task. In the following brief introduction to the arthropods, representative samples of the major groups are discussed.

Materials

For each student:

- one copy of “The Jointed-Foot Animals- Arthropoda” student pages

Teaching Hints

This activity may be completed by individual students as homework or as an in-class assignment. During your discussions of this group, emphasize the diversity in form and function. Train your students to look for the adaptive advantages of the structures and behaviors that they observe. Stress the question: How does the observed behavior or structure help the animal to survive?

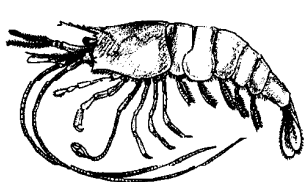
You may wish to supplement this reading with observation of living or preserved arthropods. “The Living Crab” activity in Unit IV: Waves and Life in the Surf Zone, for example, capitalizes on students’ fascination with crabs by giving them living animals to study.

Answer Key

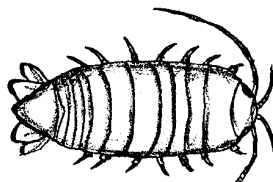
1. Student responses will vary. Students may notice that all the arthropods pictured in the reading have legs, a hard covering on their bodies, eyes, antennae, and segmented, jointed body parts.
2. Most marine arthropods are in the class Crustacea.
3. Most or all of the members of the Crustacea have or do the following:
 - a. an external skeleton (exoskeleton)
 - b. a segmented body
 - c. a body divided into three distinct regions: head, thorax and abdomen
 - d. breathe through gills and/or the body surface
 - e. an open circulatory system
 - f. liquid wastes are excreted through specialized “green glands”.
 - g. well developed eyes, antennae, balancing structures and sensory bristles

Any four of the above common characteristics will suffice to answer the question.

4.



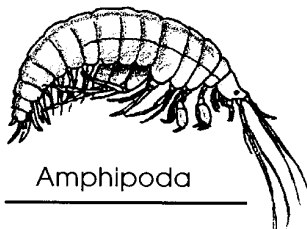
Decapoda



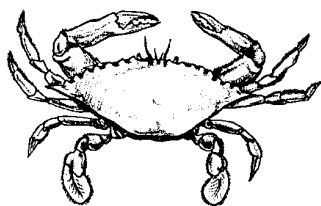
Isopoda



Thoracica



Amphipoda



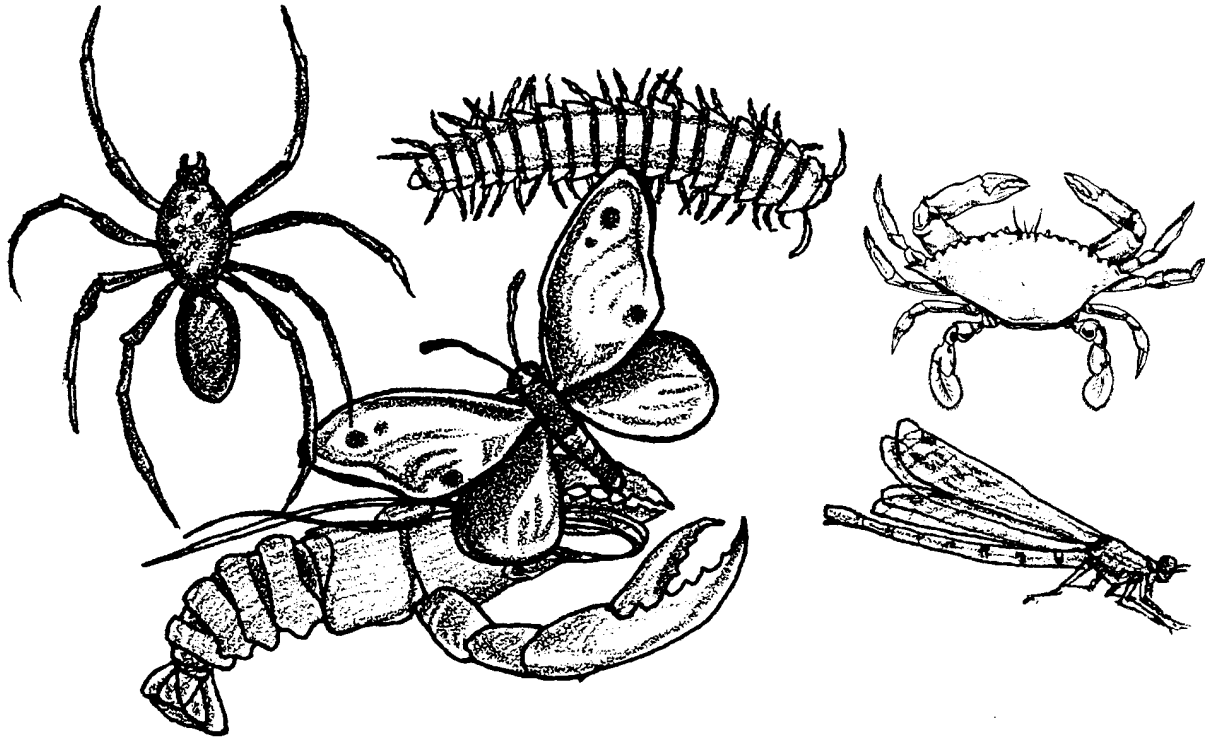
Decapoda



Isopoda

The Jointed-Foot Animals

Arthropoda



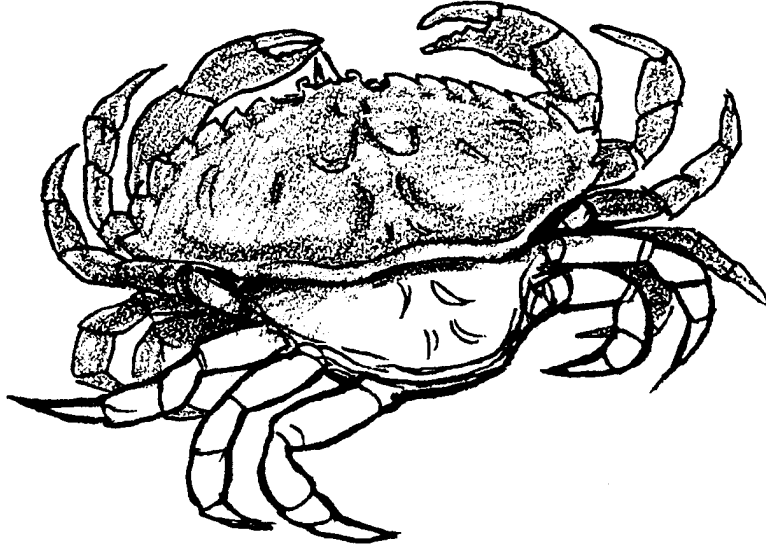
These are all arthropods.

1. Examine the drawings of some of the animals scientists classify as arthropods. What body parts and shapes do they seem to have in common?

The phylum Arthropoda is the largest of all phyla, with nearly a million different species. Arthropods live in just about every habitat that supports life. There are 25,000 or so species of arthropods living in the sea, making this phylum second only to molluscs in number of marine species.

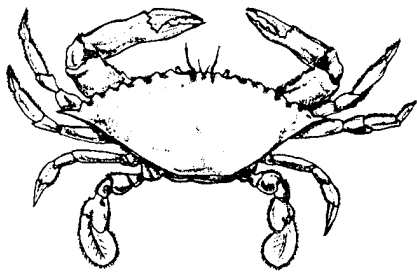
All arthropods possess an external skeleton called an exoskeleton. The muscles are inside the skeleton. The tough outer skeleton provides very good protection for the arthropods. It also has its drawbacks, however.

The exoskeleton probably has prevented arthropods from becoming very large in size because a large exoskeleton would be too heavy to carry. Furthermore, the exoskeleton makes growth a dangerous process. In order to increase in size, the old skeleton must be replaced by a new, larger one. In a process called molting, the animal literally withdraws its body, legs, gills, eyes, and antennae from the old covering.

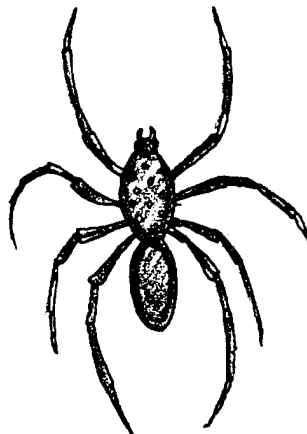


Before the new exoskeleton is firm enough to be of much protective value or to allow the animal to move, as often happens, the animals may be devoured by predators. Such a high death rate makes it necessary for most arthropods to produce large numbers of offspring.

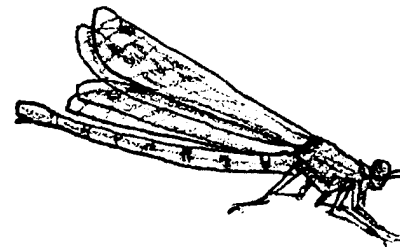
Three of the most familiar classes of arthropods are the Crustacea (crabs, shrimp, barnacles), the Arachnida (spiders, ticks, mites, scorpions), and the Insecta (insects). Fortunately for marine scientists, only the Crustacea and one group related to the spiders occur in any number in the sea.



Crustacea



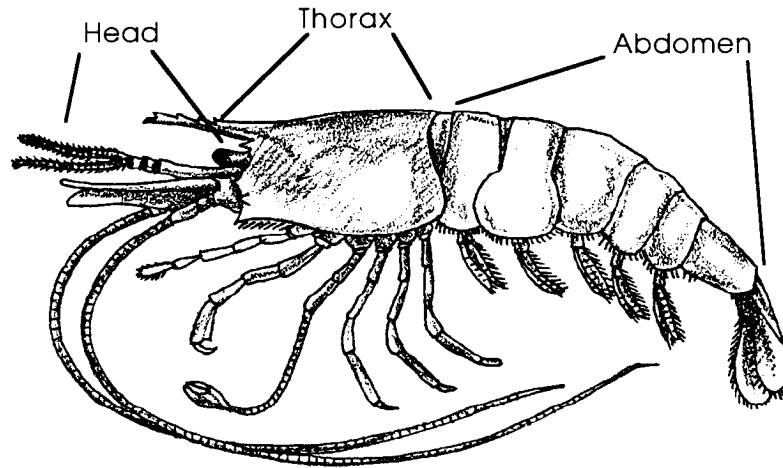
Arachnida



Insecta

2. Most marine arthropods belong to the class _____.

The segmented body of the crustacean is usually divided into three distinct regions: head, thorax and abdomen.



All crustaceans breathe through gills and/or the body surface. Oxygen, carried in the blood, is transported throughout the animal by means of an open circulatory system. An open circulatory system means the blood is not always contained within vessels as it moves about the body. Liquid wastes are carried to the base of the antennae and excreted through specialized “green glands.”

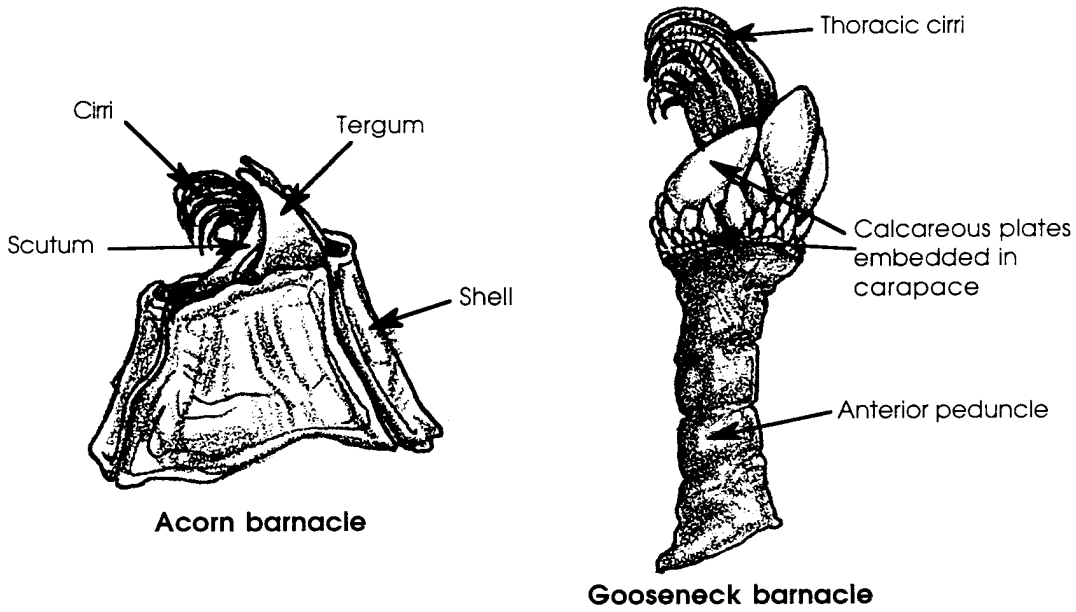
Crustaceans sense their environment through well-developed eyes, antennae, balancing structures and sensory bristles. A brain and a double nerve cord transmit the sensory messages throughout the body.

3. List 4 characteristics found in members of the Crustacea.

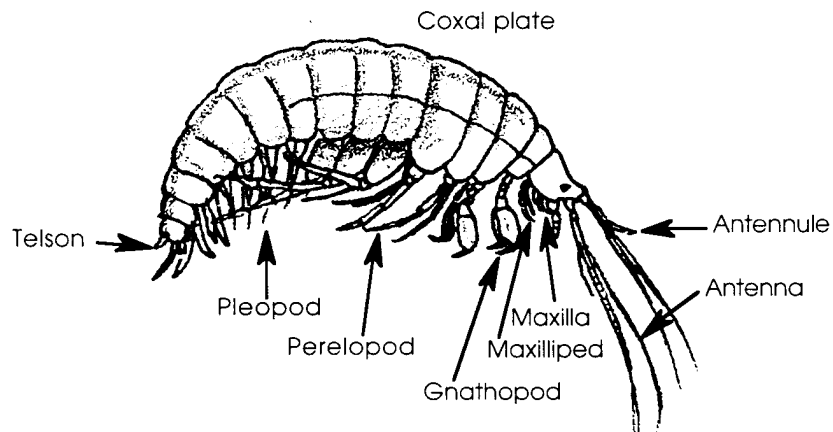
- a.
- b.
- c.
- d.

The four most common orders within the class Crustacea are:

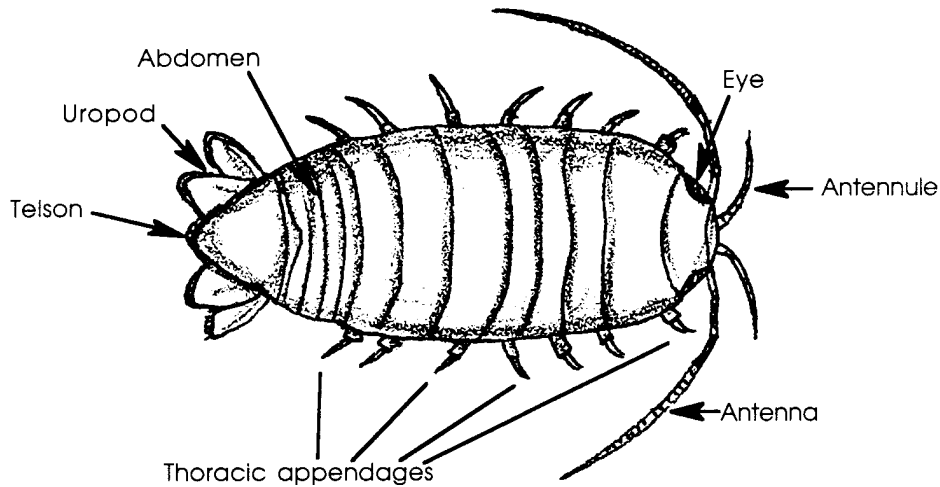
A. Thoracica - the common barnacles



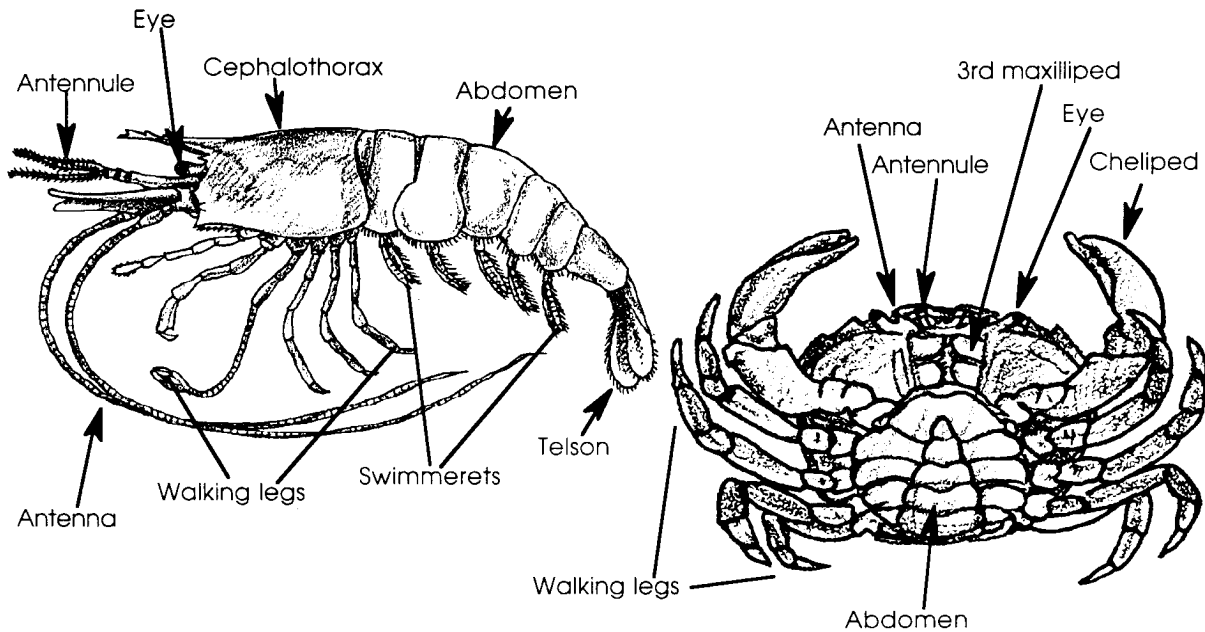
B. Amphipoda - the sand "fleas"



C. Isopoda - the pill bugs



D. Decapoda - the shrimps, ghost shrimps, hermit crabs, crabs, and lobsters.



Crustaceans play a critical role in the life of the sea. The majority of planktonic animals, the tiny drifting organisms that are a vital part of marine food chains, are crustaceans. Crustaceans range in size from these microscopic plankton to giant spider crabs with a leg span of over 3.5 meters (about 11 feet) and many are prized as food sources by humans as well as by hungry predators in the sea. Many other crustaceans are parasites, some with fantastic shapes. Numerous as drifters and swimmers, crustaceans are also well represented on the sea bottom from the intertidal zone to the abyssal depths.

4. Use the above information to place the following animals in their proper classification. Write the order name in the space below the animal.

