



Arthropods



Lab 6

Phylum Arthropoda

Spiders, crustaceans, and insects

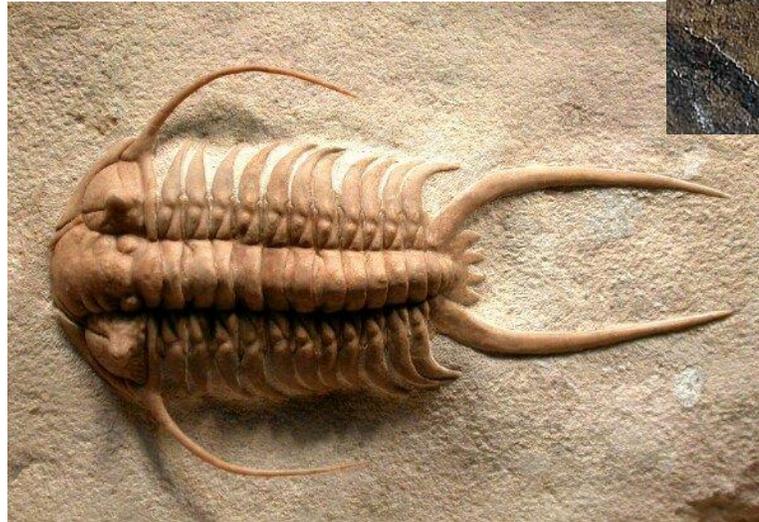
- ▶ 2/3 of all known species
- ▶ More than 1 million described
- ▶ Found in all habitats on earth
- ▶ Hard exoskeleton, segmented body, jointed appendages
- ▶ Must molt to grow
- ▶ Segments carry paired appendages
- ▶ Complex behavior patterns



Phylum Arthropoda

Trilobites

- ▶ All extinct (Permian era - 250 mya)
- ▶ Segmented bodies without specialized appendages
- ▶ Paired appendages

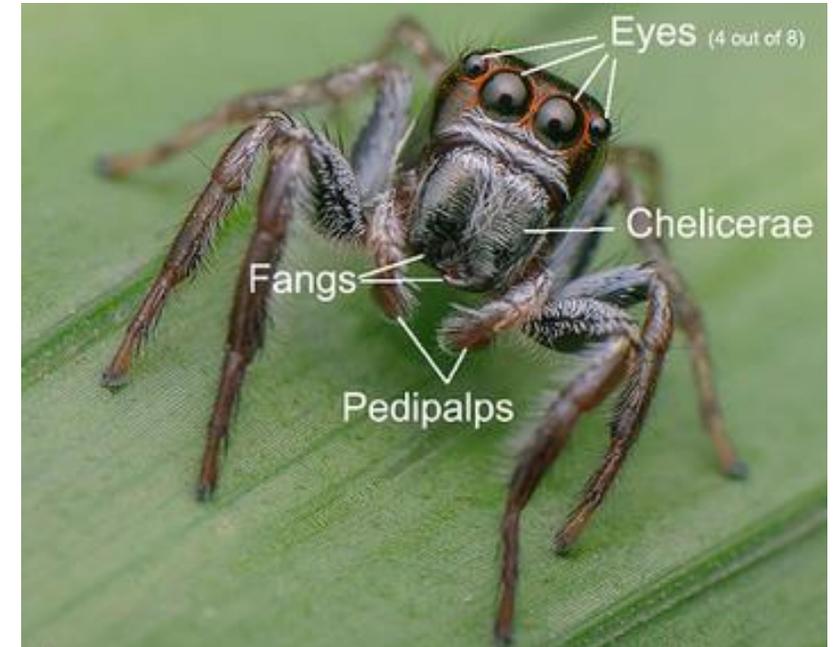


Phylum Arthropoda

Subphylum Chelicerata

Sea spiders, horseshoe crabs

- ▶ Cephalothorax and Abdomen
 - ▶ Fusion of head and thorax
- ▶ Six pairs of appendages
 - ▶ One pair of **Chelicerae**: specialized feeding appendages
 - ▶ Fangs or pinchers
 - ▶ One pair of **Pedipalps**: sensory organ, feeding, defense, reproduction
 - ▶ Four pairs of walking legs
- ▶ No antennae
- ▶ Most with simple eye (single lens)



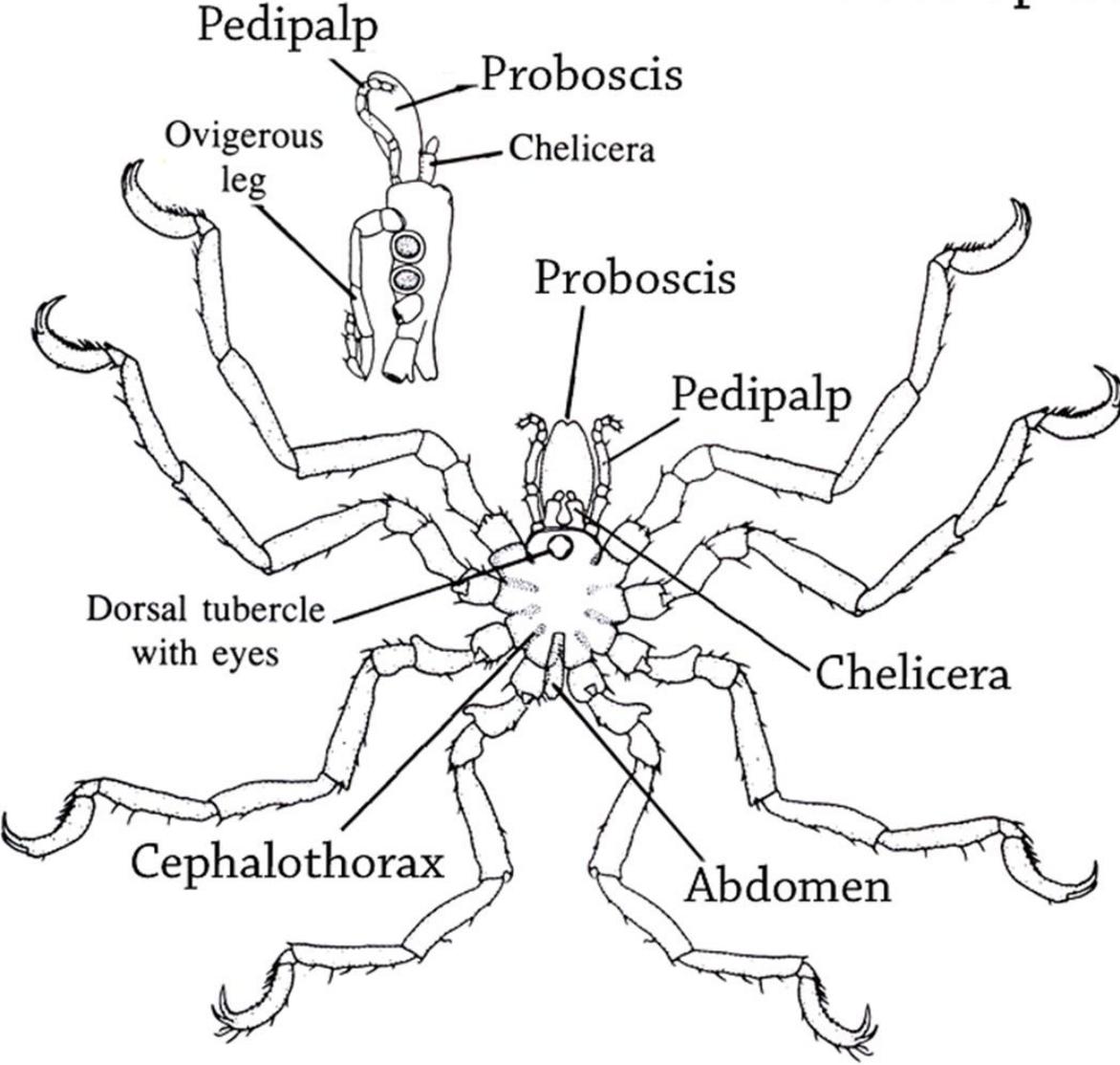
Phylum Arthropoda, Subphylum Chelicerata

Sea spiders

- ▶ Approx: 1300 species
 - ▶ Not true spiders
- ▶ Reduced body
 - ▶ No circulatory system
- ▶ Predators or scavengers
- ▶ **Proboscis**: elongated sucking mouthpart
- ▶ Typically 8 walking legs
 - ▶ May have extra legs
- ▶ Widespread marine distribution



The Sea Spider



Phylum Arthropoda, Subphylum Chelicerata

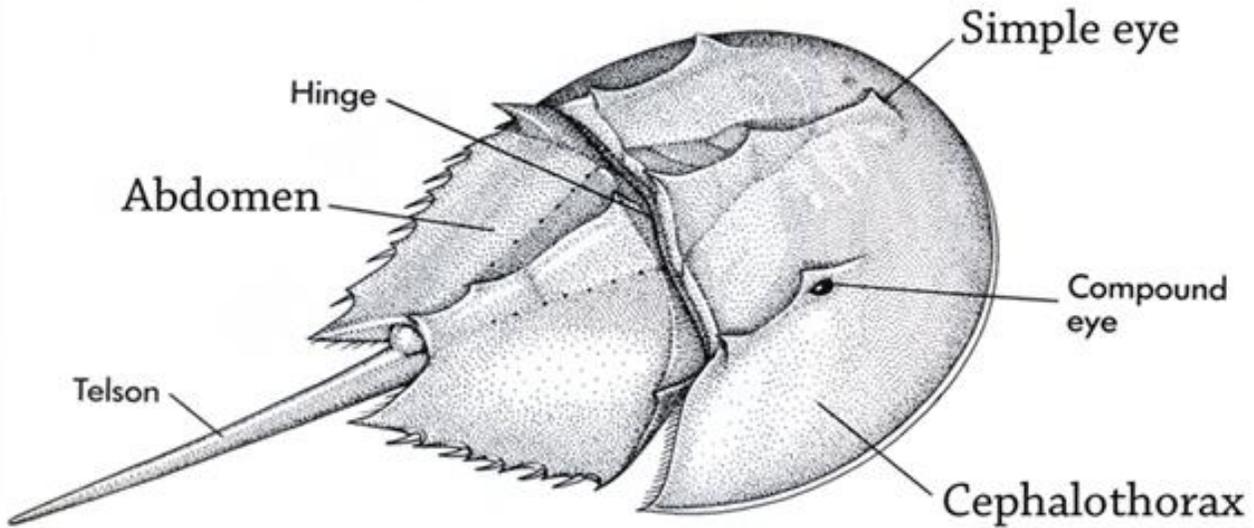
Horseshoe crabs

- ▶ Six pairs of appendages
 - ▶ One pair of chelicerae
 - ▶ Five pair of walking legs
- ▶ Unchanged since the Triassic period
- ▶ Shallow coastal waters
- ▶ Blue hemolymph used to test for bacterial endotoxins
 - ▶ Hemocyanin

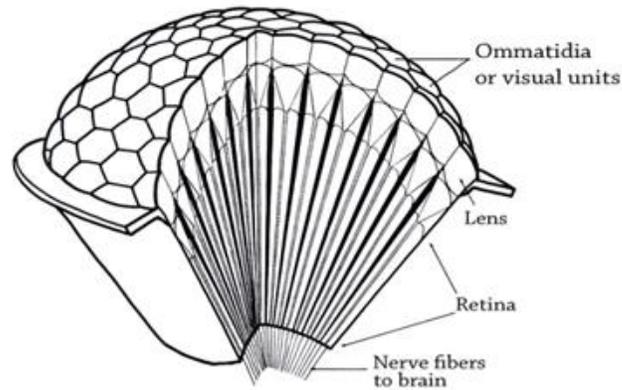




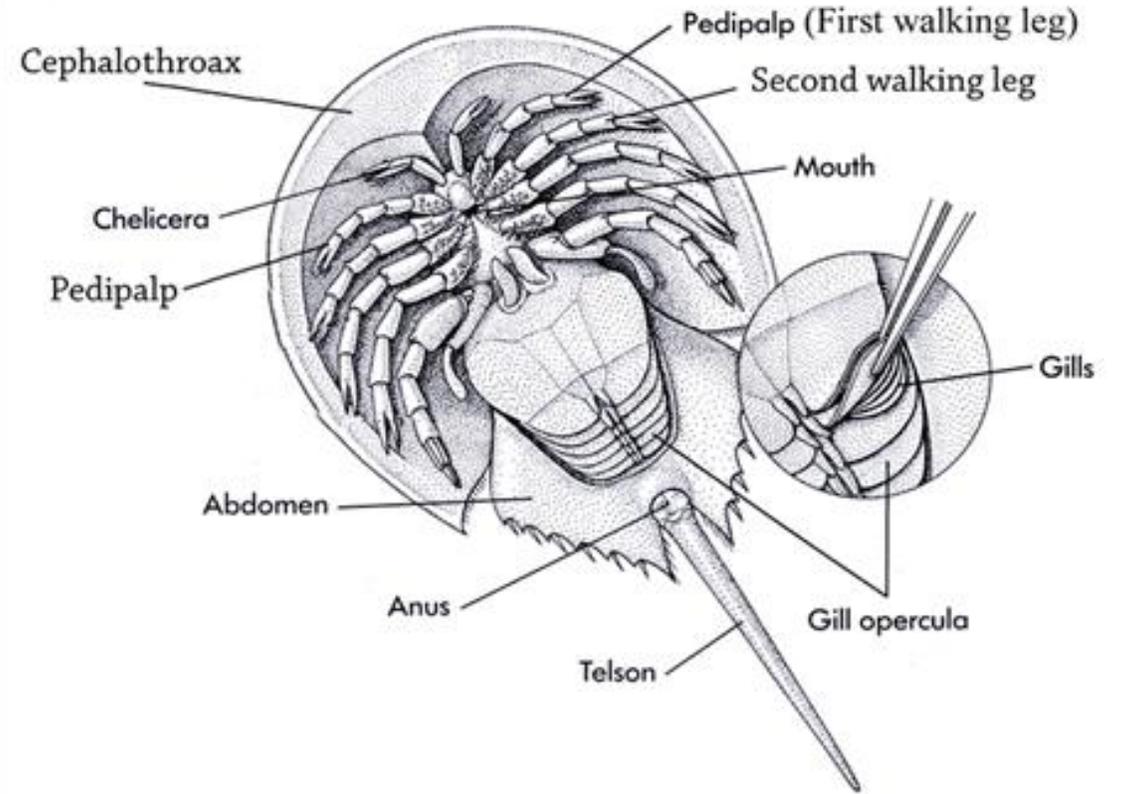
Horseshoe Crab - Dorsal View



A Compound Eye



Horseshoe Crab – Ventral View



Phylum Arthropoda

Subphylum Crustacea

Copepods, lobster, barnacles, pill bugs, amphipods, isopods, copepods, krill

- ▶ Contain two pair of antennae
- ▶ Biramous appendages (two main branches)
- ▶ Three mouth parts
 - ▶ 1 pair of mandibles
 - ▶ 2 pairs of maxillae
- ▶ Body of two or three parts
 - ▶ Appendages on thorax and abdomen
- ▶ Mostly marine



Phylum Arthropoda, Subphylum Crustacea

Class Malacostraca

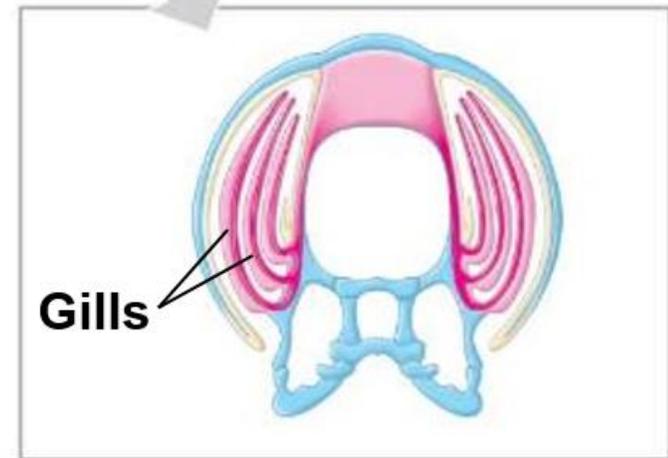
(Crabs, lobster, krill, and shrimp)

- ▶ Ten legs (Decapods)
- ▶ Mostly marine
- ▶ Calcium carbonate and chitin cuticle
 - ▶ Carapace
- ▶ Cheliped (pinchers)

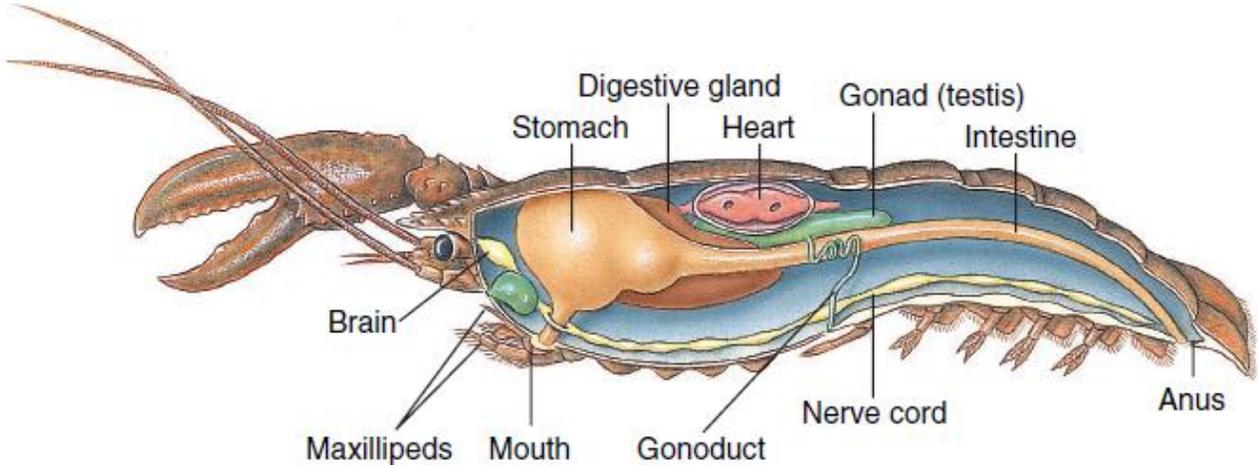
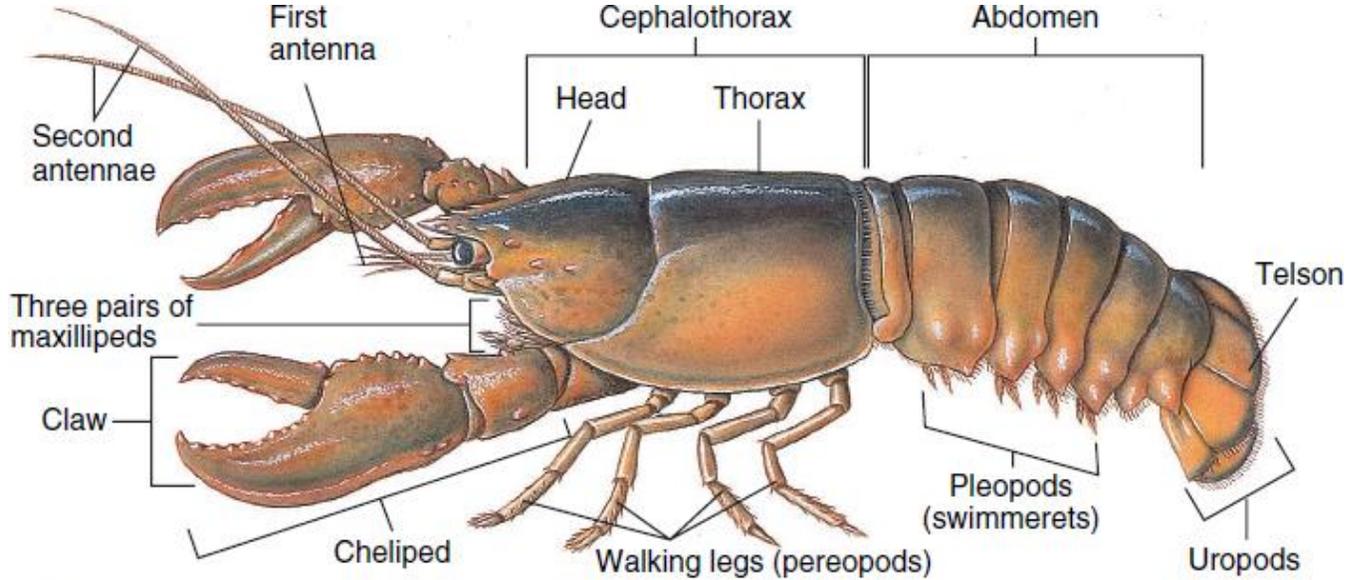


Respiration in Crustaceans

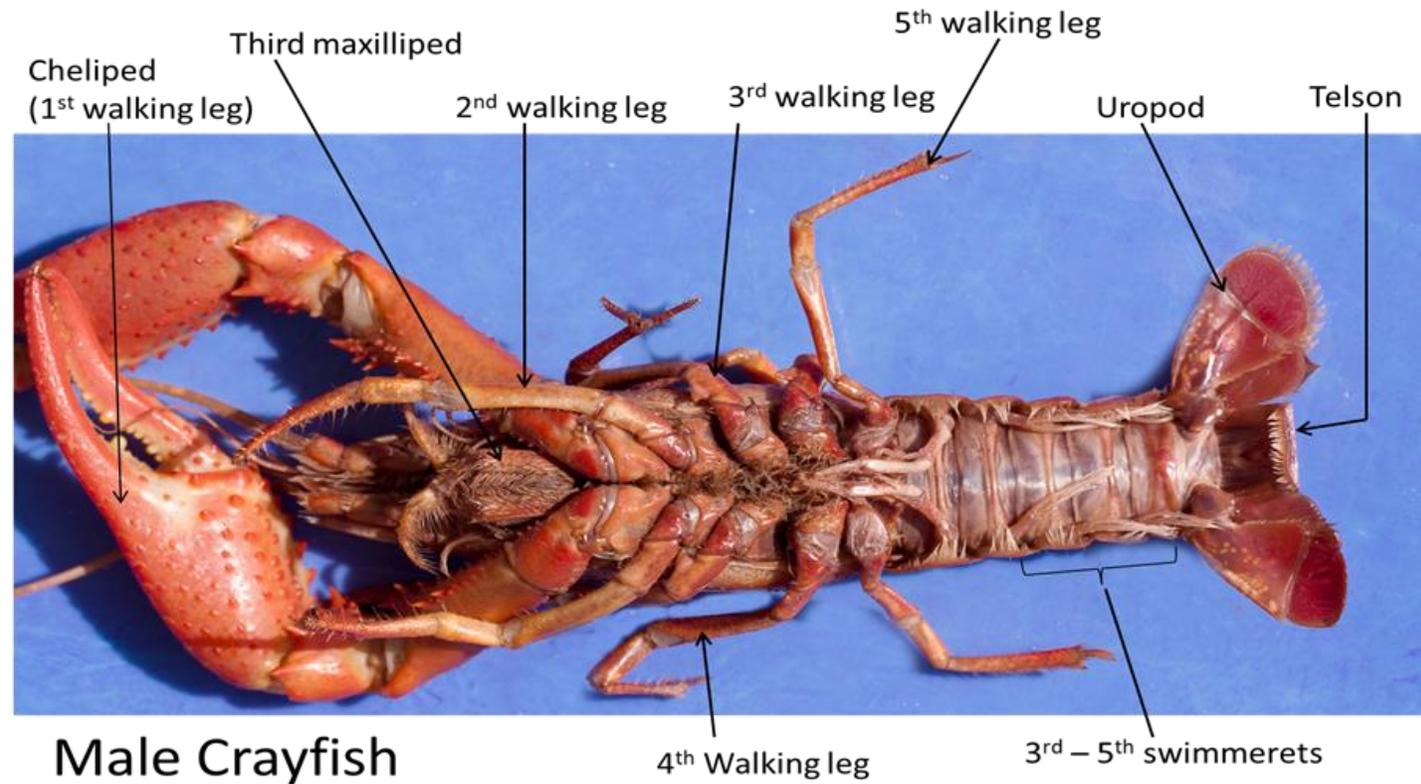
- ▶ Gas exchange occurs across long, feather gills within the body cavity
 - ▶ Specialized appendages draw water across the gills



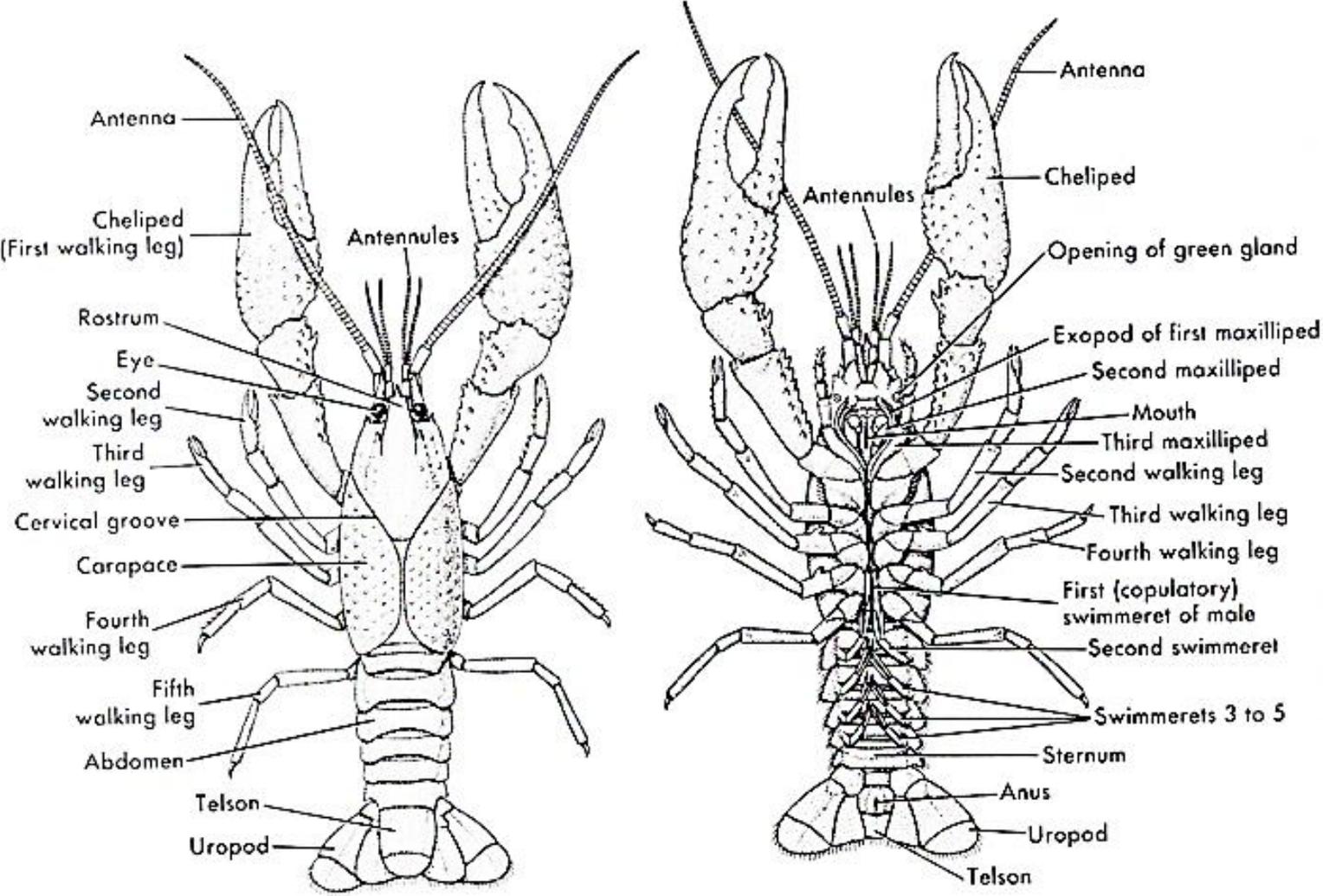
Crustacean Anatomy



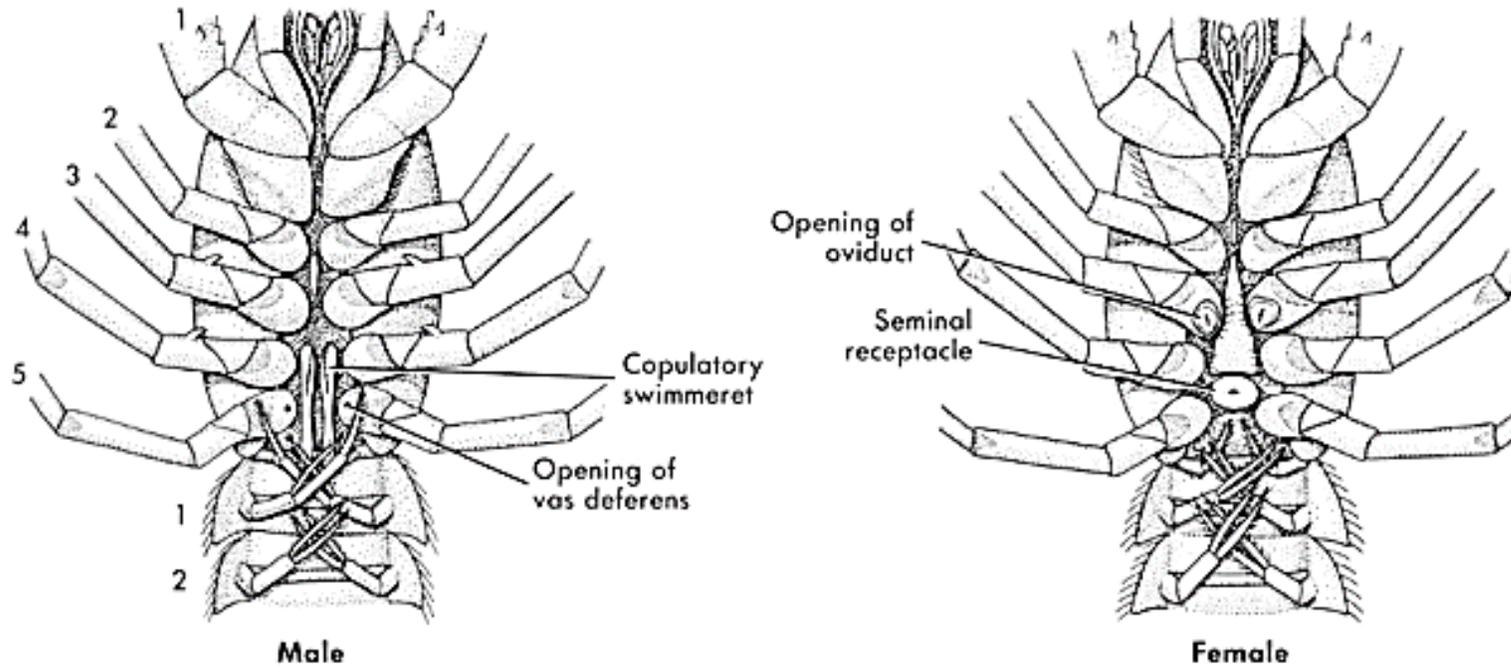
Crustacean Anatomy



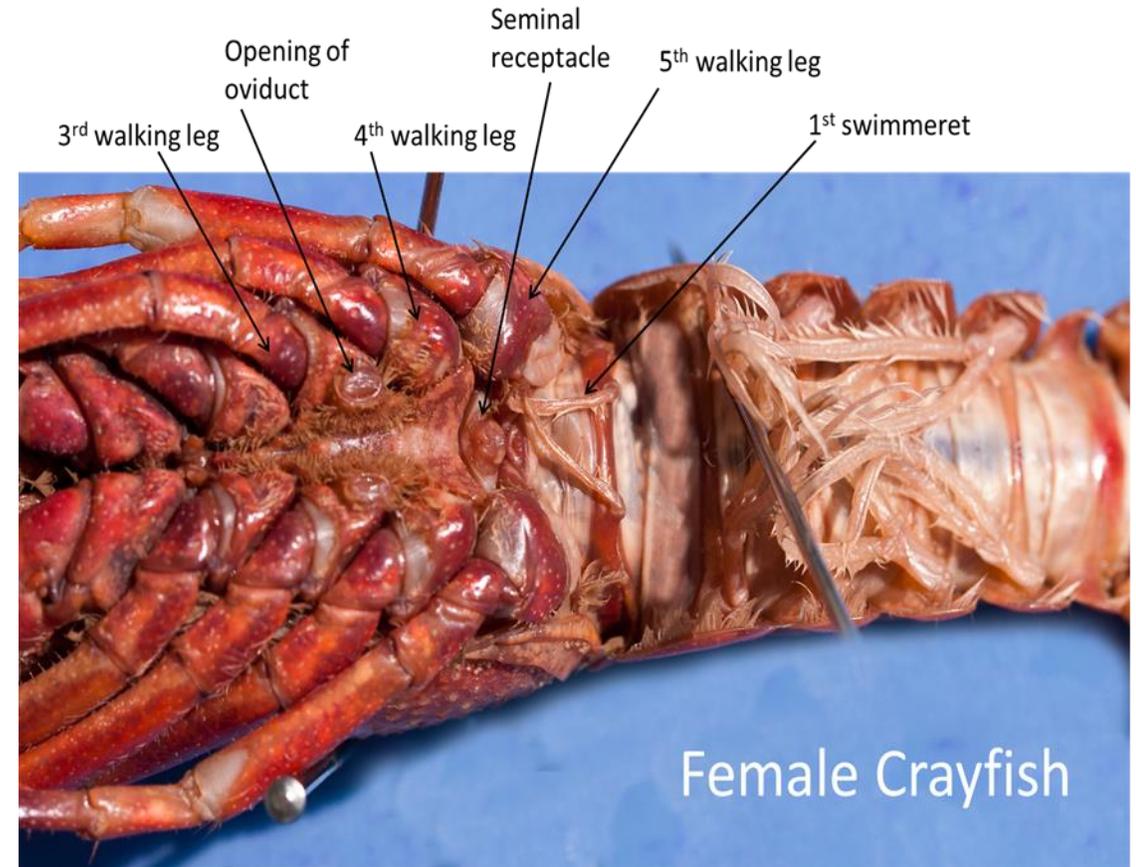
Crustacean Anatomy



Crustacean Anatomy



Crustacean Anatomy



Crustacean Anatomy

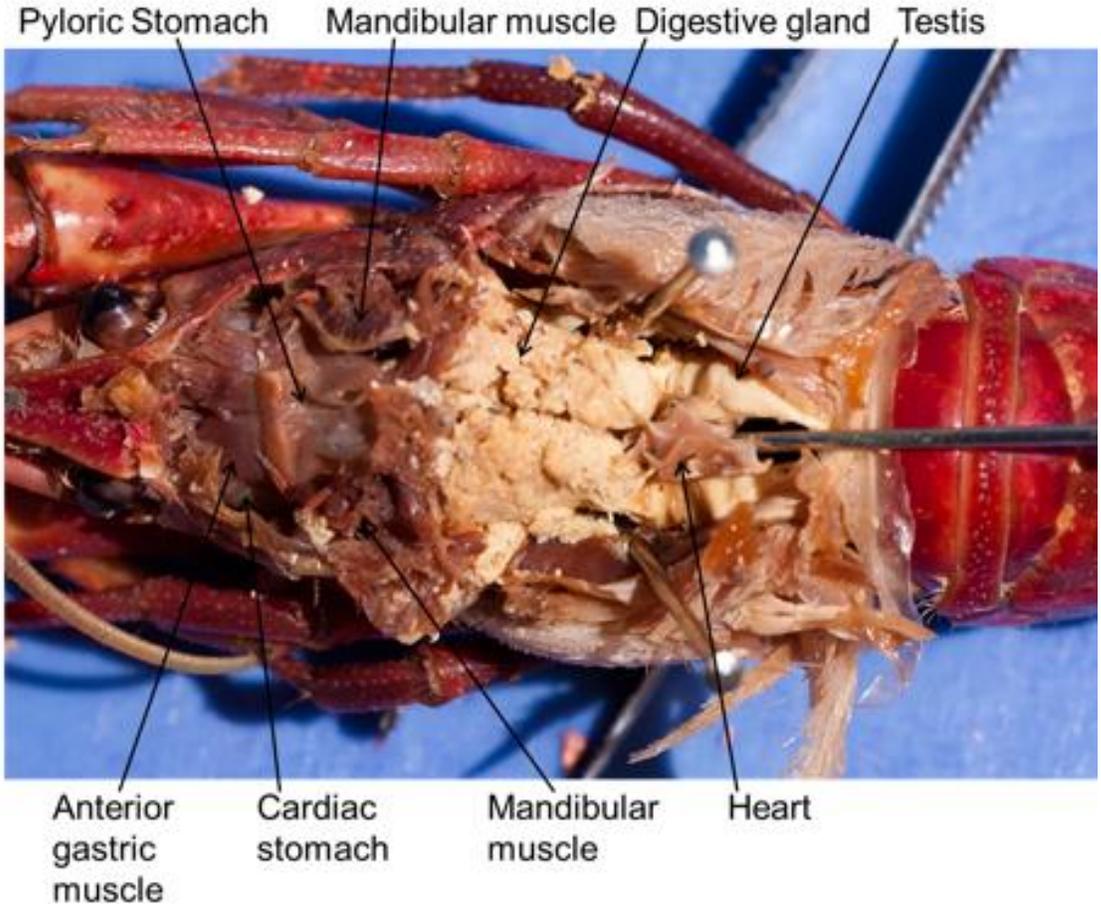


Anterior gastric muscle (off cardiac stomach)

Pyloric stomach

Mandibular muscle

Heart



Pyloric Stomach

Mandibular muscle

Digestive gland

Testis

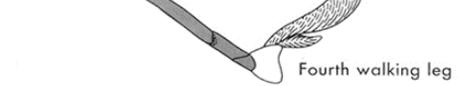
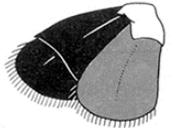
Anterior gastric muscle

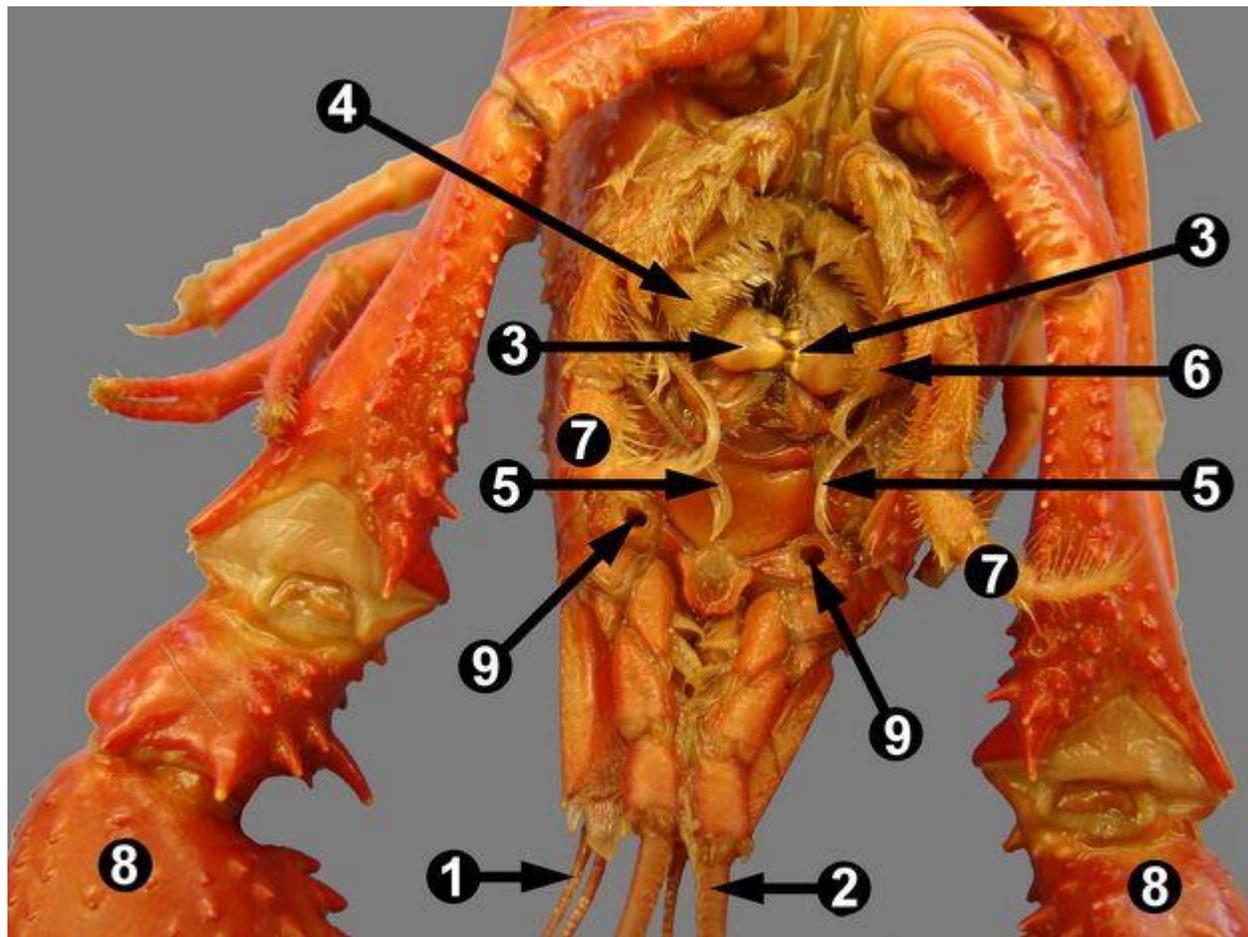
Cardiac stomach

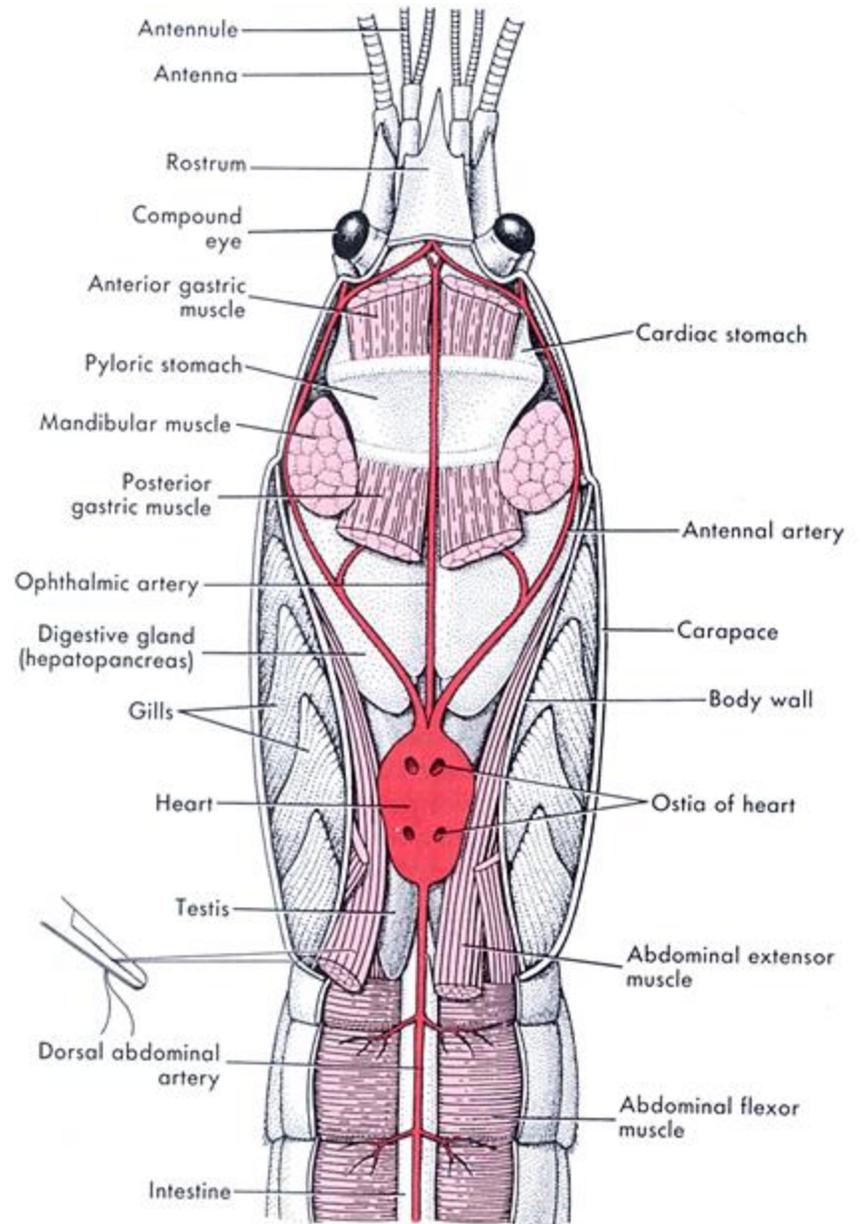
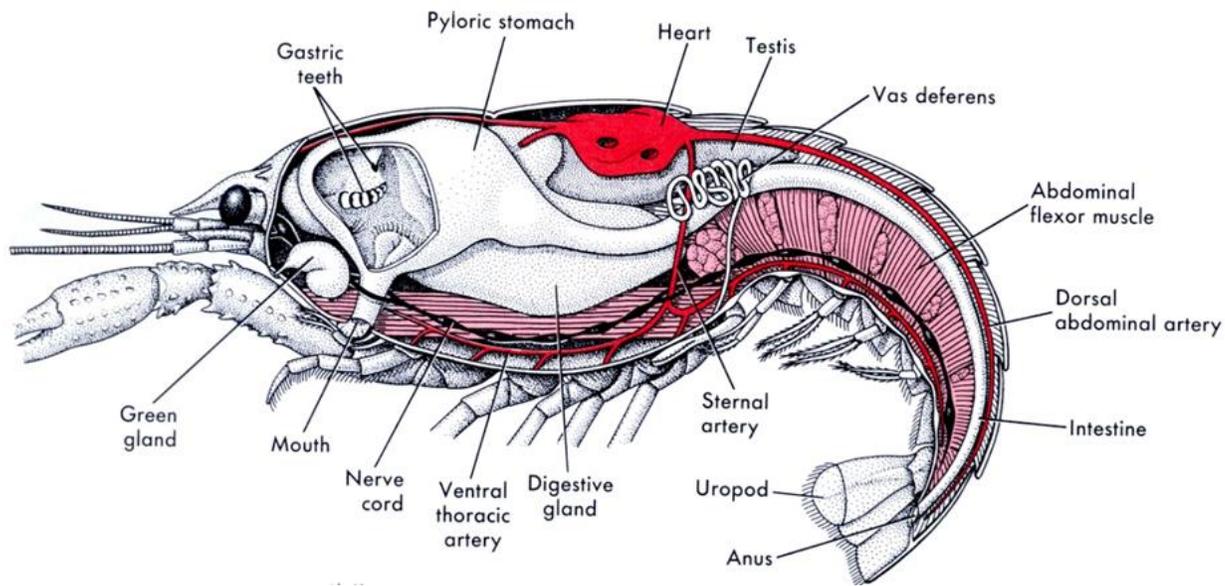
Mandibular muscle

Heart



	Appendage	Function
Head	 Antennule  Antenna  Mandible  First maxilla  Second maxilla	<p>Touch, taste, equilibrium</p> <p>Touch, taste</p> <p>Crushing food</p> <p>Food handling</p> <p>Food handling and bailing water from gill chamber</p>
	 First maxilliped (No gill)  Second maxilliped  Third maxilliped  Cheliped  Gills  Second walking leg  Fourth walking leg	<p>Touch, taste, food handling</p> <p>Grasping food, offense, defense</p> <p>Walking</p>
Abdomen	<p>Female Male</p>  First  Second  Third  Uropod	<p>Swimmerets</p> <p>First swimmerets of male transfer sperm to female, with assist of second swimmerets, swimmerets 2 to 5 of female carry eggs and young, circulate water</p> <p>Swimming, egg protection</p>





Phylum Arthropoda, Subphylum Crustacea

Krill

- ▶ Approx. 85 species
- ▶ Marine
 - ▶ Found in all the world's oceans
- ▶ Daily vertical migration
 - ▶ Surface at night and deeper depths during the day
- ▶ Important food source for many marine species including whales, penguins, seals, squid, and fish



Phylum Arthropoda, Class Crustacea

Isopods

- ▶ Approx. 11,000 species
- ▶ Dorsal/ventrally flattened
- ▶ Marine, freshwater and terrestrial
- ▶ Detritivores, herbivores, predators and parasites



Phylum Arthropoda, Class Crustacea

Amphipods

- ▶ Approx. 9,900 species
- ▶ Marine, freshwater and terrestrial
- ▶ Curved bodies that are laterally compressed
- ▶ Detritivores or scavengers

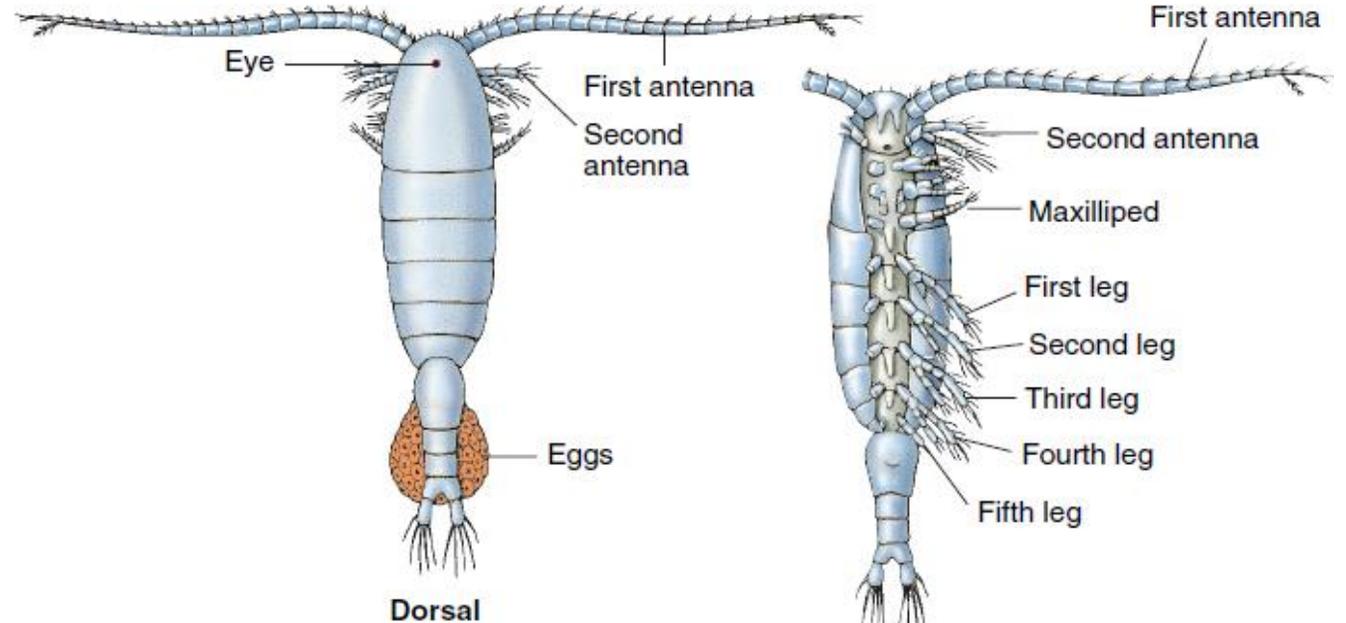


Phylum Arthropoda, Subphylum Crustacea

Class Copepoda

(Copepods)

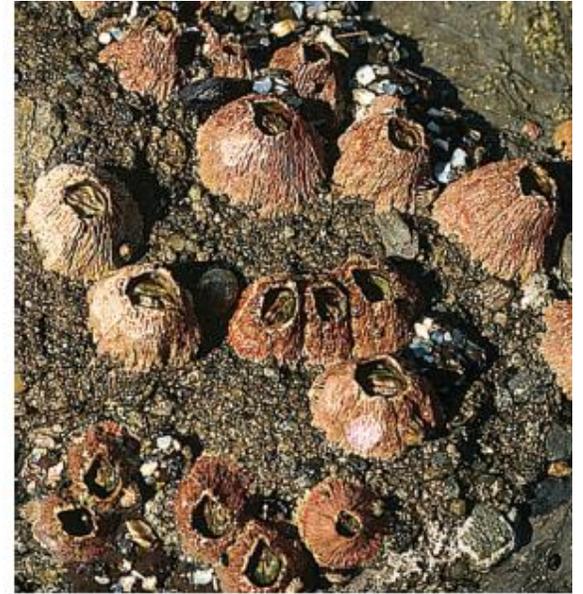
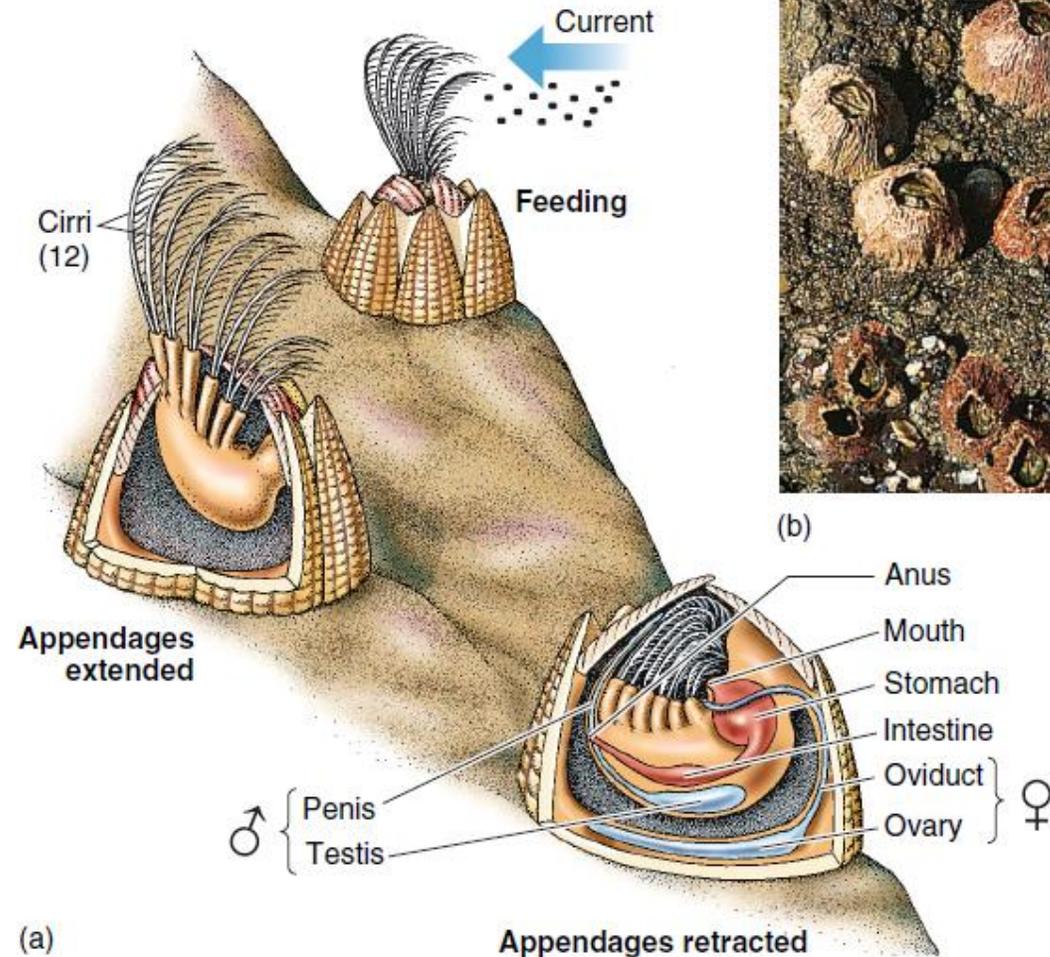
- ▶ Most planktonic
- ▶ Marine, freshwater and wet terrestrial habitats
- ▶ Small size
- ▶ Tear-drop shaped body with large antennae
- ▶ Food source for many fish species



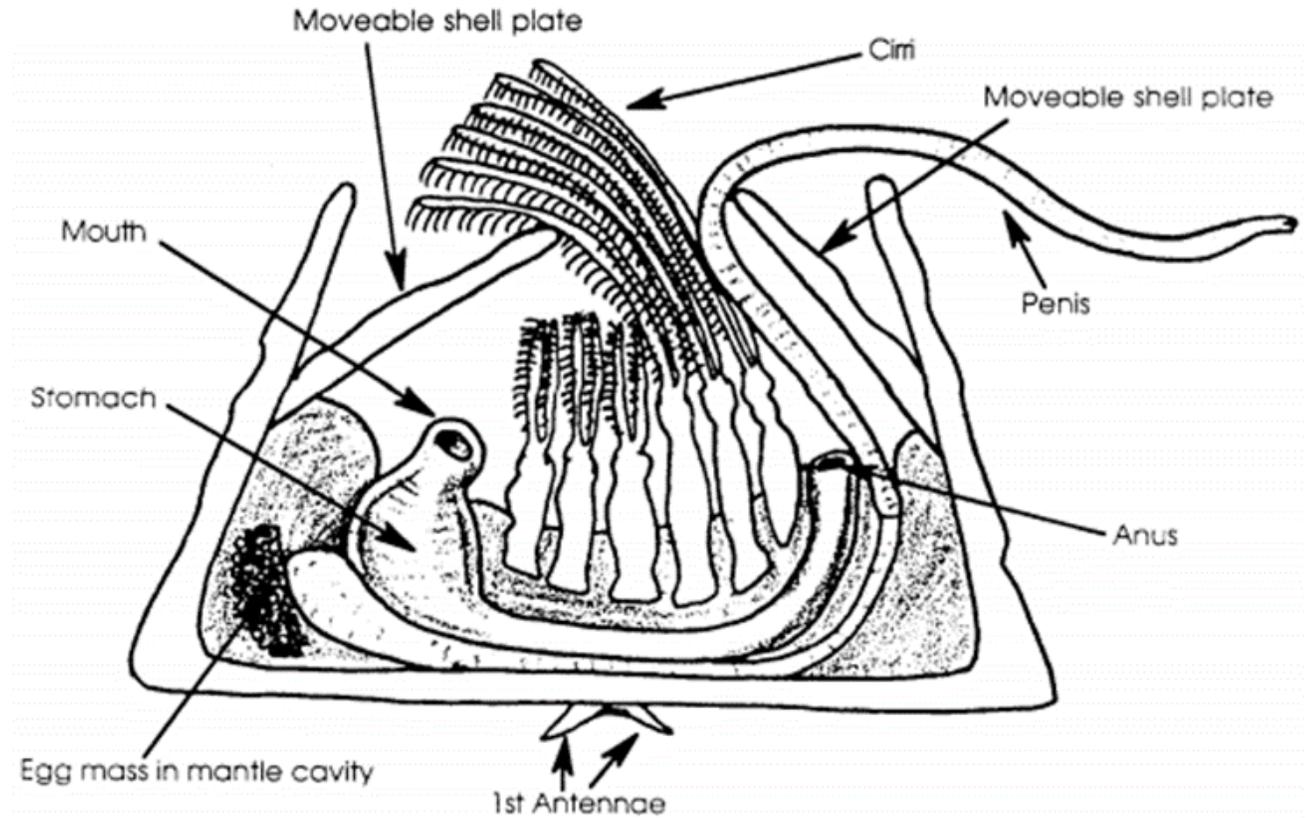
Phylum Arthropoda, Subphylum Crustacea

Class Cirripedia (Barnacle)

- ▶ Marine only
- ▶ Filter feeders
 - ▶ **Cirri**: modified feeding legs
- ▶ Calcium carbonate cuticle



Barnacle Anatomy



Acorn Barnacle

