

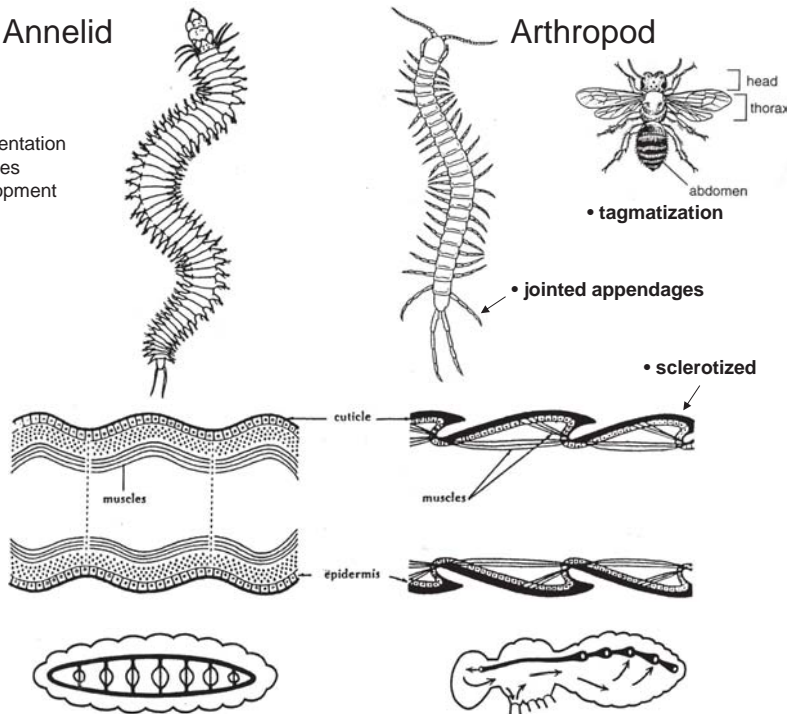
**Annelid**

**Arthropod**

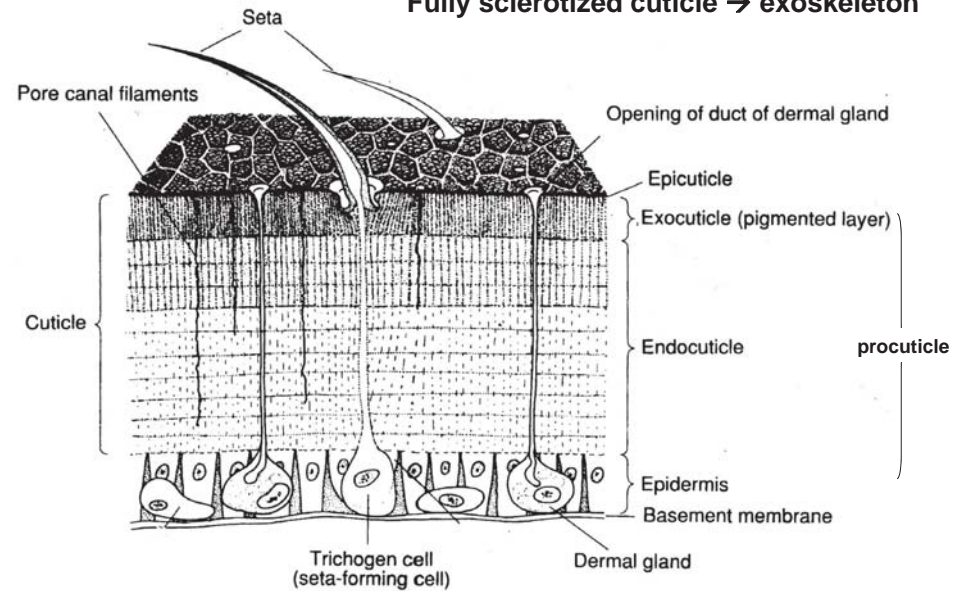
- Similarities:
- metameric segmentation
  - paired appendages
  - teloblastic development

- Differences:
- muscles
  - body cavities

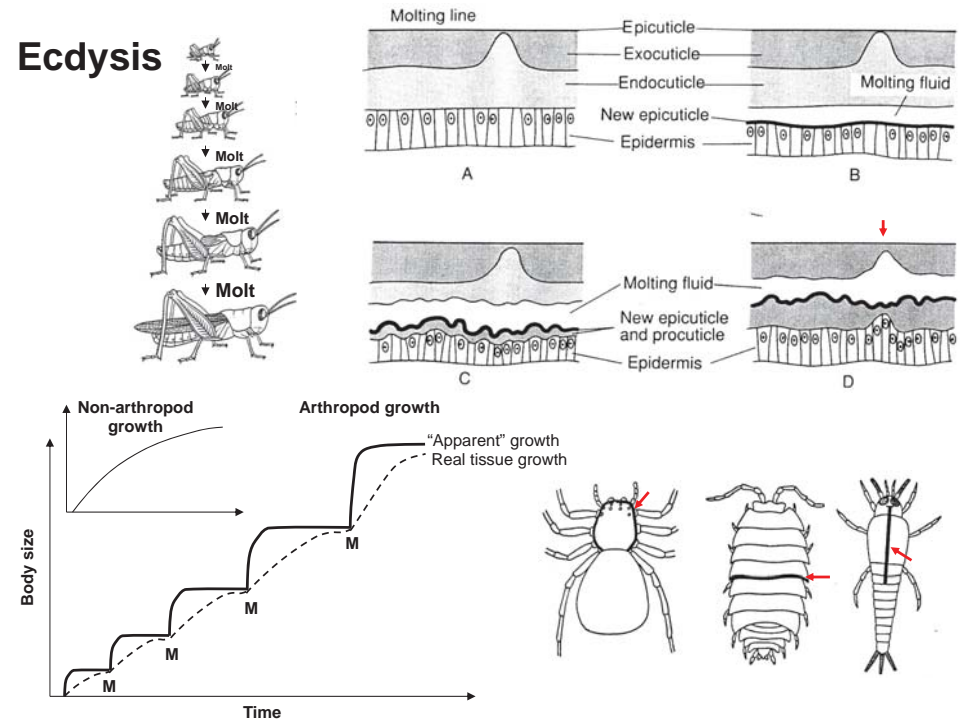
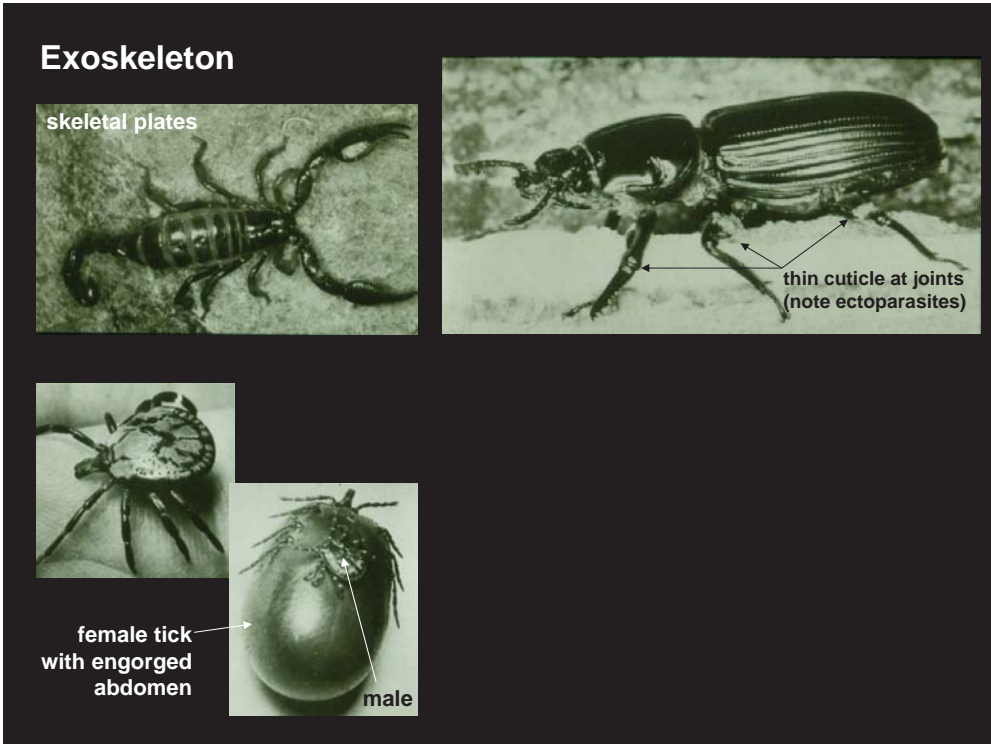
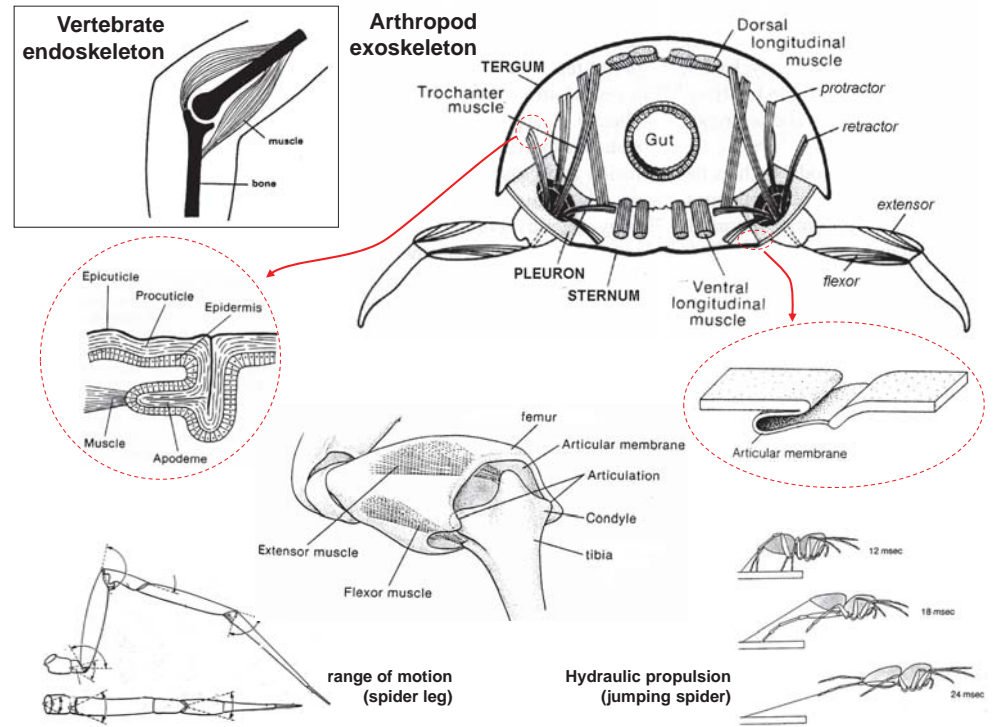
- circulatory



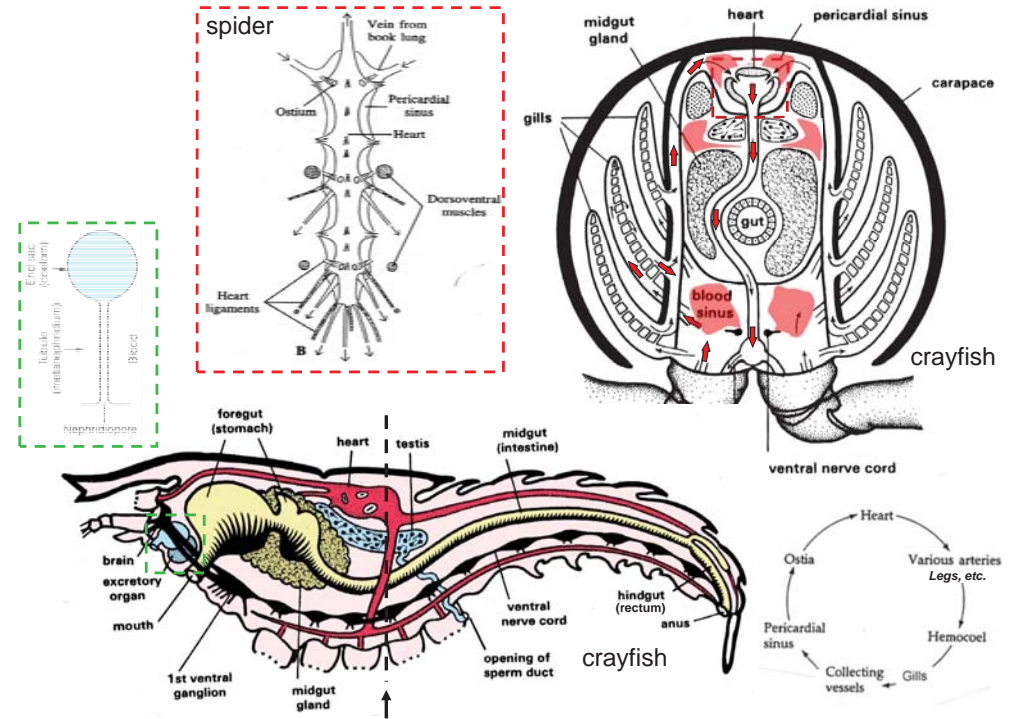
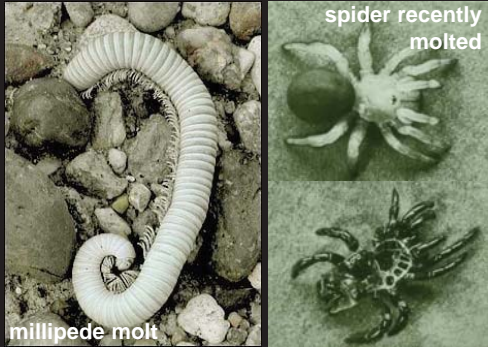
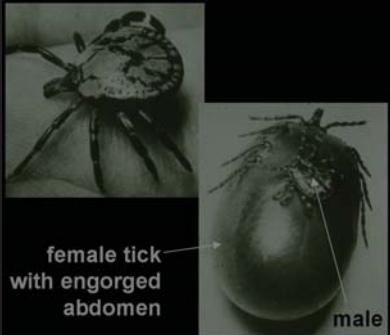
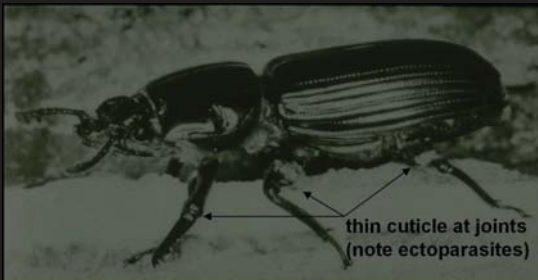
**Fully sclerotized cuticle → exoskeleton**



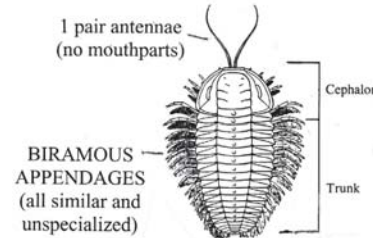
- Other components:
- glycolipids (water retention)
  - mineral salts (hardness)



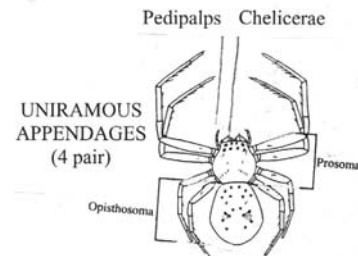
# Exoskeleton and molting



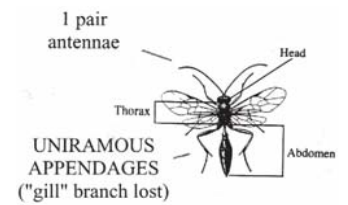
## ARTHROPOD SUBPHYLA



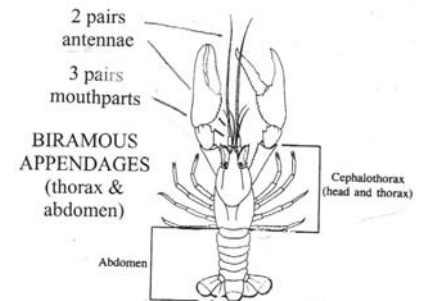
TRILOBITOMORPHA (extinct)



CHELICERATA (e.g., spider)

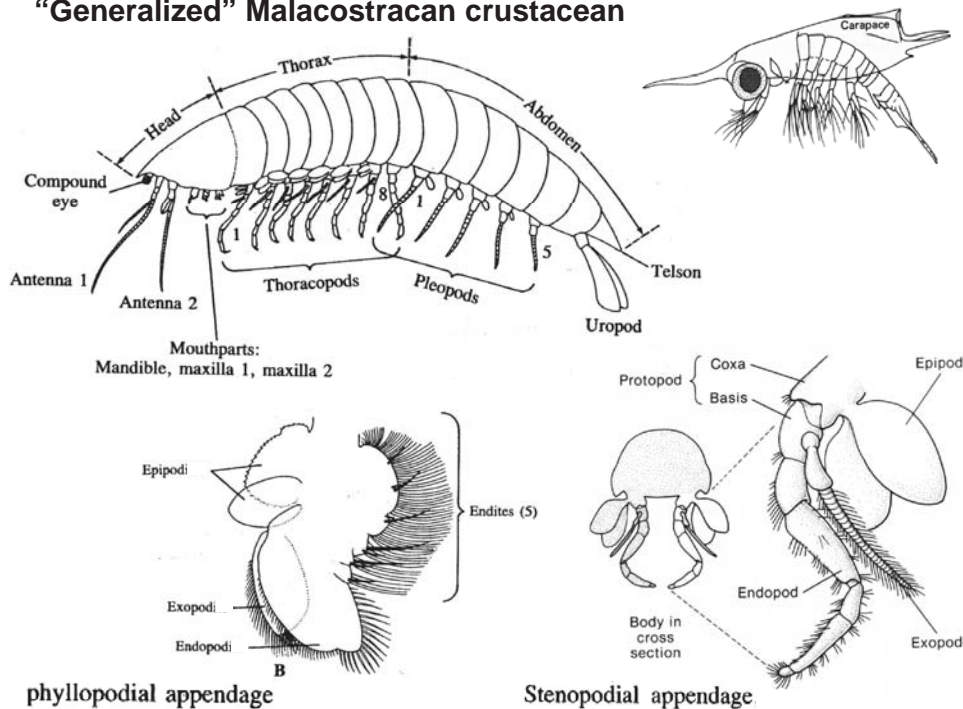


TRACHEATA (e.g., insect)



CRUSTACEA (e.g., lobster)

# "Generalized" Malacostracan crustacean



# Diversity in tagmata and jointed appendages



Cheat-sheet for select crustacean classes, subclasses, superorders, orders, & infraorders

Arthropoda (3)				
Class	Antennae	Tagmata	Mandibles	Appendages
Chelicerata	none	prosoma, opisthosoma	absent	uniramous (4 pr.)
Tracheata (Uniramia)	1 pair	head, thorax, abdomen	tip functional	uniramous
Crustacea	2 pairs	head, thorax, abdomen*	base functional	typically biramous

\* head, thorax often fused into cephalothorax

Within Crustacea (5)	
Class	Description
Malacostraca	19 segments, abdominal appendages
Maxillopoda	10 or fewer segments, no abdominal appendages

Within Maxillopoda (7)	
Subclass	Features
Copepoda	Body divided into cephalosome, metasome, urosome
Branchiopoda	Repeated phyllopodial appendages (except cladocerans)
Cirripedia	Barnacles: highly reduced abdomen, calcified plates; several parasitic orders
Ostracoda	Bivalved carapace

Within Malacostraca (2)			
Subclass	Abd. segments	Carapace	Example
Phyllocarida	7	Joined by adductor muscle	O. Leptostraca (e.g. <i>Nebalia</i> )
Eumalacostraca	6		

Within Eumalacostraca (5)				
Superorder	Carapace fused...	Eye	Brood pouch	
Hoplocarida	to 3 segments, covers 4	stalked	absent	
Peracarida	variable, to no more than 4	unstaked	formed from oostegites	
Eucarida	to all 8 = cephalothorax	most stalked	absent	

Within Eucarida (3)		
Order	First 3 thoracopods...	Example
Euphausiacea	Pleopods (legs)	krill
Decapoda	Maxillipeds (leaving 10 pereopods)	shrimp, crab, lobster

Within Decapoda (8)				
Infraorder	Eyes	8 <sup>th</sup> thoracopod	Abdomen	
Anomura	Int. to 2 <sup>nd</sup> antennae	Reduced	Variable	
Brachyura (true crabs)	Ext. to 2 <sup>nd</sup> antennae, stalked	Visible	Tightly oppressed to shell	

Within Peracarida (9)			
Order	Eye	Carapace	Special appendages
Mysidacea	Stalked	Yes	1 or 2 maxillipeds
Cumacea	"Sessile"	Yes	3 maxillipeds; no pleopods in female
Tanaidacea	"	Short	Gnathopods
Isopoda	"	No	7 "same" thoracopods
Amphipoda	"	No	3 pairs uropods, gnathopods

## MAJOR TAXA

Ph. Arthropoda (>1,000,000 spp)

Subph. Crustacea (68,000)

→ **Cl. Malacostraca** (22,600)

Subcl. Eumalacostraca

Supero. Eucarida (10,000)

→ **O. Euphausiacea** (krill)

→ **O. Decapoda**

(Caridea (shrimps)

Astacidea (lobsters, crayfishes)

Brachyura (crabs)

Anomura (pagurids, lithotids,

porcellanids, galatheids)

Thalassinida (ghost/mud shrimp))

Supero. Peracarida (8,000)

→ **O. Isopoda, O. Amphipoda**

[gammarids, caprellids,

hyperiids], cumaceans,

tanais, mysids

Supero. Haplocarida (300)

→ **(O. Stomatopoda)**

Subcl. Phyllocarida (20)

→ **Cl. Maxillopoda**

→ Subcl. Copepoda (8405)

(Calanoida, Harpacticoida, Cyclopoida)

→ Subcl. Ostracoda (5650)

→ Subcl. Branchiopoda (900, cladocerans)

→ Subcl. Cirripedia (900)

Thoracica (acorn & goose barnacles)

Acrothoracica (boring barnacles)

Ascothoracica (parasites of cnidarians, echinoderms)

Rhizocephala (parasites of crustaceans)

Subph. Tracheata (=Uniramia, ≈ 1x10<sup>6</sup>)

Cl. Myriopoda

Cl. Hexapoda

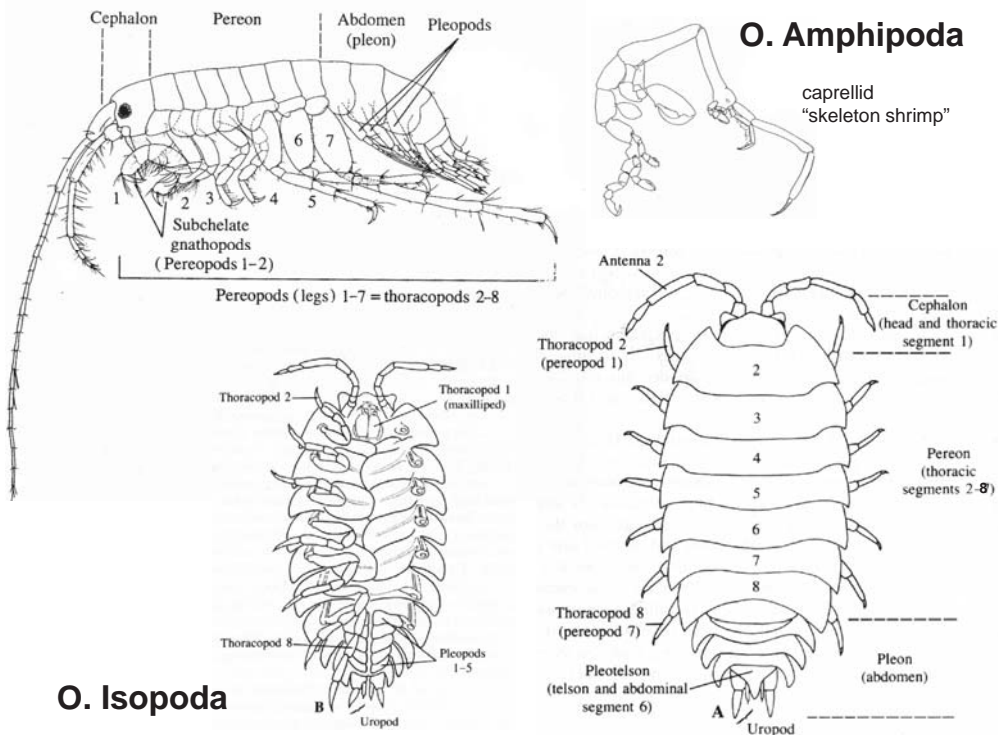
Subph. Chelicerata (70,000)

Cl. Merostomata (4, horseshoe crabs)

Cl. Pycnogonida (1000, sea spiders)

Cl. Arachnida (spiders, etc.)

Subph. Trilobitomorpha (extinct; 4000)

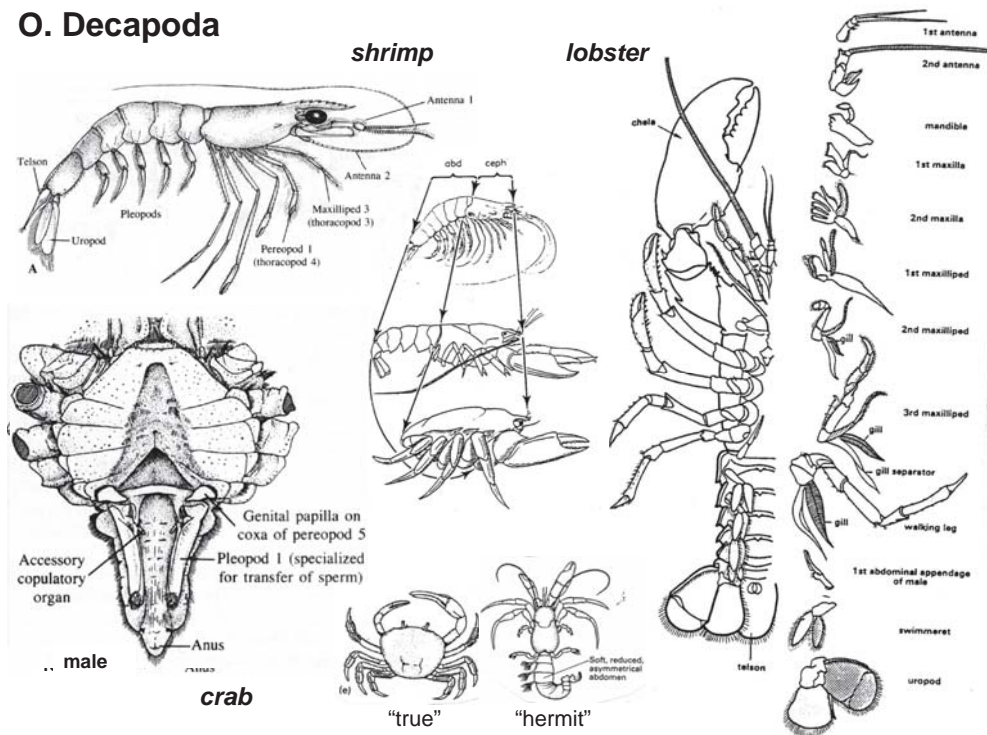


**O. Amphipoda**

caprellid  
"skeleton shrimp"

**O. Isopoda**

**O. Decapoda**



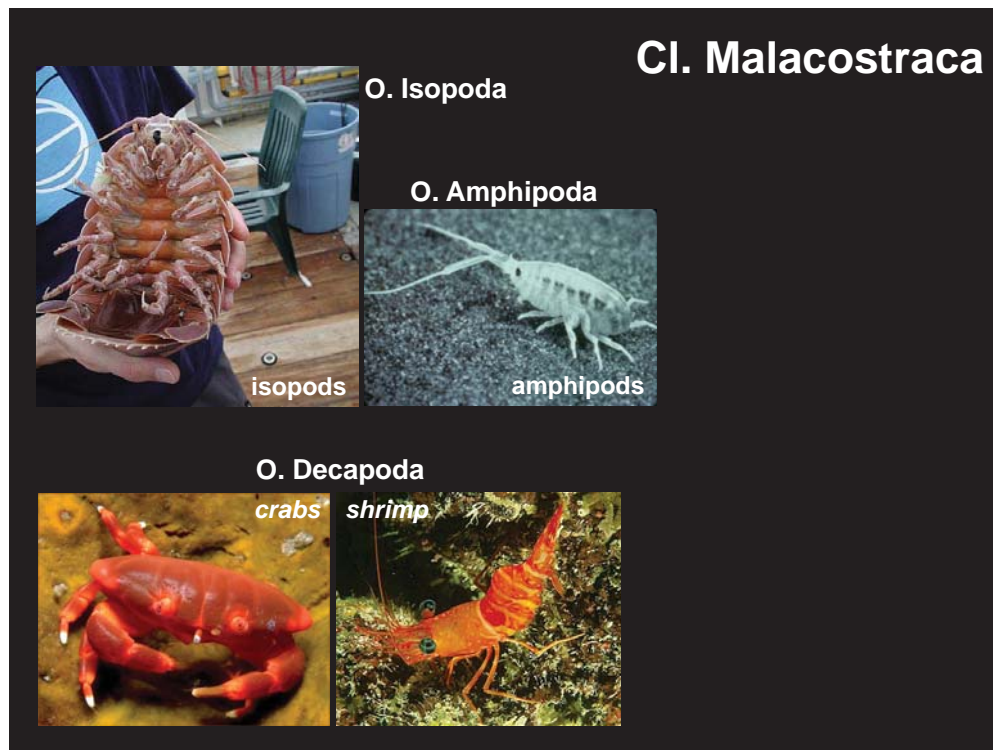
*shrimp*

*lobster*

*crab*

"true"

"hermit"



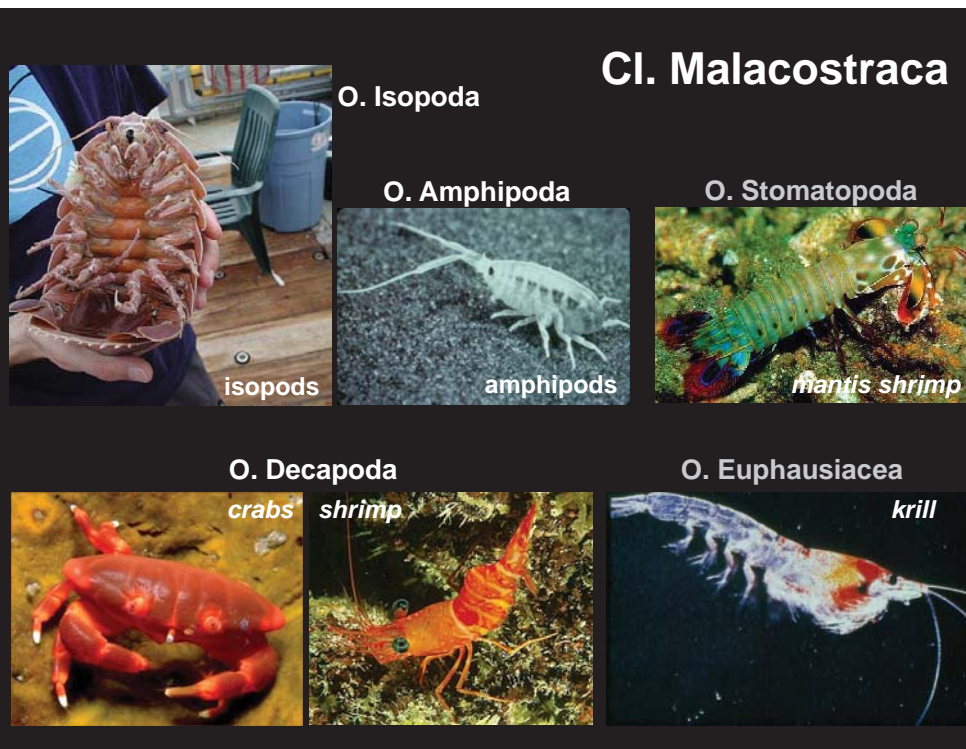
**Cl. Malacostraca**

O. Isopoda

O. Amphipoda

O. Decapoda

*crabs* *shrimp*



**Cl. Malacostraca**

O. Isopoda

O. Amphipoda

O. Stomatopoda

O. Decapoda

*crabs* *shrimp*

O. Euphausiacea

*krill*