

KINGDOM ANIMALIA: Next 3 Phyla

Refer to the ***Phylum Summary Table*** for characteristics of the next 3 phyla: ***Mollusca, Echinodermata & Arthropoda.***

Phylum Mollusca

2nd largest phylum
= soft-bodied, animals usually have a calcified shell

4 classes: **SEE TABLE OF CLASSES**
gastropoda, bivalvia, polyplacophora, cephalopoda

Phylum Echinodermata

Ex) Sea stars, sea cucumbers, feather stars, sea urchins, sand dollars

Additional characteristics:

- Has a ***water vascular system*** for movement, & structure (internal skeleton = endoskeleton)

Water vascular system

- network of canals which sea water circulates through = hydrostatic skeleton
 - The water vascular system is unique to Echinoderms

Water vascular system of Sea Stars

- Madreporite/ sieve plate: water enters vascular system
- Ring canal: surrounds mouth & leads to radial canals
- Radial canals: 5 of them – one down each arm
- Ampulla: muscular sac that controls tube feet by forcing water into it.
- Tube feet: create suction to adhere to substrate
 - Movement, feeding, excretion, respiration, sensory organ

Phylum Arthropoda

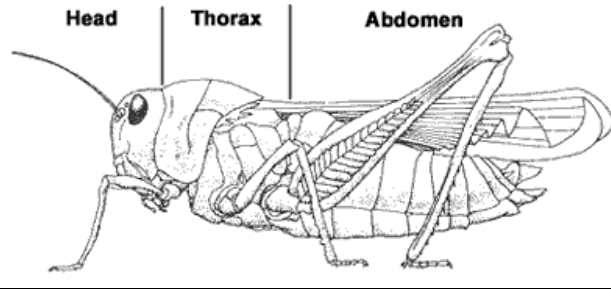
Ex. Crayfish, insects, spiders, & millipedes

Additional Characteristics:

- **Segmented**:
 - Head
 - Thorax
 - Abdomen

 - When the head & thorax are fused = **cephalothorax** (spiders & crayfish)

Typical Arthropod Body Plan



Exoskeleton (external skeleton) composed of chitin.

- Covering on outside of body to protect internal muscles, blood vessels, & organs
- “suit of armour”
- But it is heavy & cumbersome – it does not grow with the animal and must be molted
- Jointed appendages
- Compound eye for many arthropods

Subphylum Crustacea

Ex. Lobsters, crabs, crayfish

- **Two** pairs of antennae
- **Three** pairs of feeding appendages
- Appendages for walking and swimming
- Cephalothorax and abdomen
- If it loses a leg or claw it can regrow a new one = regeneration

Subphylum Uniramia

- **One** pair of antennae
- Unbranched appendages
- 2 classes:
 - Class Myriapoda
 - Class Insecta

1. Class Myriapoda (bunch of legs)

Ex) centipedes & millipedes

- Centipedes:
 - **ONE** pair of legs per segment
 - FLAT body
 - Poison claw
- Millipedes:
 - **TWO** pairs of legs per segment
 - ROUNDED body

2. Class Insecta= INSECTS!

- 3 pairs of legs on thorax (6 legs total)
- 3 body segments:
 - Head
 - Thorax
 - Abdomen

Life Cycle of Insects

Metamorphosis: dramatic change in form (from baby to adult body plan)

- 2 types:
 - **Complete metamorphosis**

Ex) caterpillar to butterfly
 - Egg → Larva → Pupa → Adult (ELPA)
 - (*Larva body is totally rearranged into an adult*)
 - **Incomplete metamorphosis**

Ex. Grasshopper
 - Egg → Nymph → Adult (ENA)

Subphylum Chelicerata

Class Arachnida ex. Spider, tick, mite, scorpion

- NO antenna
- First pair of appendages are for feeding = chelicerae. In spiders, *chelicerae* are used to inject venom and digestive enzymes into prey (sucks up liquefied tissues)
- Second pair = *pedipalps* – feeding and holding prey.
- 8 legs (4 pairs)
- Cephalothorax and abdomen

Subphylum Trilobita

- All are extinct – known by the fossil record (~4,000 species)
- Led to many of the living members of Arthropoda today

Molting of the Exoskeleton (Shedding)

Growth in steps for all arthropods:

1. New exoskeleton is formed under the old one
2. Water or air is drawn in to “inflate” the new skeleton. The built up pressure causes the old one to split off exposing the new one.
3. Water or air is expelled leaving a space for the animal to grow into it.

The animal is vulnerable until the exoskeleton hardens. (Takes hours or days to harden.)

Adaptations of Arthropods to Land

- Exoskeleton
- Spiracles – openings in exoskeleton to outside = tracheal system
- Book lungs & tracheal system
- Walking legs
- Wings
- Malpighian tubules – excretion.