

Biology 15.1

Arthropods

1. The largest phylum in the animal kingdom of over one million known species.
2. Habitat: ubiquitous
3. Organization: Triploblastic, systems, unidirectional gut, coelem, and **body segmentation**.
 - A. head
 - B. thorax
 - C. abdomen
4. Symmetry: Bilateral
5. Integument: Epidermis secretes chitin (tough & flexible) and salts (hardness) for exoskeleton
6. Skeletal system: **Exoskeleton, invertebrate**
 - A. Nonliving protective and supportive external covering made of chitin
 - B. Weight limitation: land arthropods 11 inches or smaller
 - C. Molting necessary for growth. Body swells for a couple days, cracks and wiggles exoskeleton, then new exoskeleton hardens.
 - D. Jointed appendages
 1. *Arthropoda*: joint footed
 2. Every part that moves requires a joint and internal control
 3. Grasshoppers (spring muscle)
 4. Spiders (hydraulic pressure)
7. Muscle system: attach to inside of exoskeleton.
8. Movement: mobile, walk, crawl, fly, swim
9. Nervous system & senses: Ventral Nervous System
 - A. Pair of ganglions for a brain
 - B. Paired ventral nerve cord
 - C. Antennas: smell, touch, taste
 - D. Eyes: compound and simple
10. Behavior/activity: variety of behavior levels from taxis
11. Nutrition: Heterotrophic
12. Digestive system: Unidirectional system
13. Respiratory system: gills and/or lungs
14. Circulatory system: Open circulatory system
 - A. Dorsal, autonomic heart, usually a single chambered tube when present.
 - B. squeezes blood through short open ended vessels
15. Immune system: innate immunity of killer cells; and immunocytes capable of encapsulation and phagocytosis
16. Excretion:
 - A. Aquatic arthropods: ammonia removed through gills; nephridia remove urine
 - B. Terrestrial arthropods: Malpighian tubule system removes uric acid into hindgut.
17. Reproductive system: most dioecious, few monoecious. Some capable of parthenogenesis. Some aquatic arthropods use external fertilization.
18. Life cycle: usually larvae hatched from eggs (oviporous). Scorpions are viviparous. Hatchlings can be miniature adults; but grubs or caterpillars must metamorphose into adult form.
19. Five classes of arthropoda
 - A. Crustaceans: lobsters, crabs
 - B. Arachnids: spiders
 - C. Centipedes: one pair of legs per body segment
 - D. Millipedes: two pairs of legs per body segment
 - E. Insects: grasshoppers, fleas, beetles, flies
20. Interesting facts
 - A. The Rhinoceros Beetle (Family: Scarabaeidae) can lift 850 times its own body weight.
 - B. A Dragon Fly can reach speeds of 58 kilometres per hour.
 - C. A Cockroach can run over 3 miles per hour.
 - D. The Giant Stick Insect can reach over one foot in length.