

Chapter 23-Invertebrates

- **Understand the key features of animals**
 - Multi-cellular
 - No cell wall
 - Obtain energy by consuming other organisms
 - Most produce sexually
 - Motile at some point in their life
 - Able to respond rapidly to external stimuli
 - Actual tissues began to appear where there weren't before and body symmetry caused them to branch off
 - Also the appearance of tissues
- **Be able to explain the difference between radial and bilateral symmetry**
 - Symmetrical animals have an upper (dorsal) surface and a lower (ventral) surface
 - Radial symmetry- can be divided into roughly equal halves by any plane that passes through the central axis- however you divide it in half it would be the same
 - Bilateral symmetry- can be divided into mirror-image halves only along one plane that runs down the midline
- **Know the major animal phyla and distinguishing characteristics of each**
 - Animals probably originated from ancestral protists
 - 27 phyla of animals
 - Most are invertebrates (lack a vertebral column)
 - Less than 3% of all known animals are vertebrates
 - **Phylum Porifera**
 - Sponges
 - Immobile
 - Reproduce asexually by budding where the adult produces miniature versions of itself that drop off and assume an independent existence
 - Also produce sexually through fusion of sperm and eggs
 - No true tissues and organs
 - Body perforated by tiny pores through which water passes, and by fewer, large openings through which water is expelled
 - As water passes through the sponge, oxygen is extracted and microorganisms are filtered out and digested by individual cells

- Some sponges contain chemicals useful to humans such as treatment for AIDS patients and promising new cancer drugs

o **Phylum Cnidarian**

- Well-armed predators such as sea jellies, anemones, corals, and hydrozoans
- Mostly marine and are all carnivorous predators
- Most lack true organs and have no brain but rather a network of nerves that controls movement and feeding behavior
- Have stinging cells called cnidocytes that are used to capture prey and for defense
 - Contain a finely coiled fragment that is expelled when the trigger is touched
 - o Some inject poison, others stick it to the prey to entangle it
 - o The venom can cause extreme pain or death in humans
- Box jellyfish

o **Phylum Ctenophora**

- Comb jellies- b/c they use cilia to move
 - Carnivorous
 - Can release both sperm and eggs considered ASEXUAL

o **Phylum Plathelminthes**

- Parasitic or free living
- Include flatworms
- Non-parasitic, free-living flatworms inhabit aquatic, and moist terrestrial habitats
- Can reproduce both ways but are mostly hermaphrodites
- Have organs but no respiratory and circulatory systems
- Have a distinct head with sensory organs
- Their nervous system consists of clusters of nerve cells called ganglia in the head, forming a simple brain
- In the absence of a respiratory system, gas exchange is accomplished by diffusion between body cells and the environment
- Some are harmful to humans
 - Tapeworms

o **Phylum Annelida**

- Segmented worms
- Produce sexually
- Some are hermaphroditic
- Some annelids reproduce asexually through fragmentation which is when the body breaks into two pieces and each of which regenerates the missing part

- **Phylum Mollusca**
 - Most mollusks have shells and include clams, snails and cephalopods
 - Produce sexually
 - Some species have separate sexes and others are hermaphroditic
- **Know the 3 classes of mollusks and be able to give examples of each**
 - **Gastropods**
 - One-footed crawlers which include **snails and slugs**
 - Muscular foot for locomotion
 - They may possess a shell but not all are shelled
 - They feed using a radula, a flexible ribbon studded with spines that scrape algae from rocks or grasp larger plants or prey
 - **Bivalves**
 - Filter feeders which include **scallop, oysters, mussels, and clams**
 - Live in fresh water and marine habitats
 - Have two shells that can be clamped shut by a strong muscle
 - Filter feeders that use gills for both feeding and respiration
 - Most have a muscular foot used for burrowing or for attaching to rocks
 - **Cephalopods**
 - Marine predators which are **octopuses, nautilus, cuttlefish, and squids**
 - Predatory, marine carnivores
 - Large, complex brains and are capable of learning
 - Possess highly developed sensory systems and some have shell but most do not
 - Have tentacles with chemosensory abilities and suction disks- used for locomotion and to capture prey
 - Some release ink to escape from predators
- **Understand the key features of arthropods, including what an exoskeleton is and the process of molting**
 - **Phylum Arthropoda**
 - Most diverse and abundant group
 - Insects, arachnids, myriapods, and crustaceans
 - Have appendages and an exoskeleton which is composed of protein and chitin
 - Exoskeleton protects against predators
 - Provides for a range of movement of the appendages
 - Provides a watertight covering
 - Can be shed so the animal can grow
 - Complex sensory and nervous systems, responsible for finely coordinated movement and complex behaviors
 - Compound eyes, chemical and tactile receptors
 - 360 vision
 - Insects are the only flying invertebrates- most abundant and diverse, ability to fly which allows them to escape and find lots of food