# NOTES: Fish and Amphibians

What is a Chordate?

Characteristics of chordates

1. notochord: a flexible rod that extends along the length of the developing organism
2. Nerve cord
3. Pharyngeal pouches: slit-like openings between the body cavity and the outside of the body (present only during the early stages of the organism

Vertebrates

- Vertebrates make up the largest group of chordates
- Have an internal system of bones called endoskeleton
- have a backbone
- well developed head protected by a skull and other bones support and protect internal organs
- Animals that have a backbone are called vertebrates
- Belong to Kingdom: Animalia
  Phylum: Chordata
  Subphylum: Vertebrata

Body temperature

- Ectotherm: depend on their surroundings to stay warm, body temperature changes as environment temperature changes "cold-blooded"
- Endotherm: animals with stable body temperature, "warm-blooded"

Fish

- Born to swim – fish have many body parts to help them swim
- fins: used to steer, stop, and balance, fan-shaped structures help fish move
- scales: bony structures to protect the body and lower friction
- Use gills to breathe. Gills: organ removes oxygen from water

Senses in fish (have a brain and keep track of information)

- all fish have a sense of vision, hearing, and smell
- lateral line system: rows of sense organs that detect water vibrations

Reproduction

- external fertilization: female lays eggs in water, male drops sperm on them (most fish)
- internal fertilization: male deposit sperm inside female and female lays fertilized eggs or eggs develop inside female

Three classes of living fish

*Agnatha:* jawless fish

- Only two types left in the world: lampreys and hagfishes
- eel-like with smooth, slimy skin and a round jawless mouth
- Skeleton made of cartilage; have a notochord; have skull, brain, and eyes
- Some lampreys are external parasites that feed on other fish
- mouth is recessed within a funnel-like structure
- tooth-like hooks in the funnel
- rough tongue scrapes off small particles of the host's skin
- and flesh and sucks it up with the blood; after it has fed, it drops off

- Hagfish are scavengers that feed on dead or dying animals; it enters the body and feeds on internal organs
- are bottom dwellers, live only in cold water (oceans), produce a lot of mucus and when agitated can turn a bucket of water into a jelly-like substance in minutes

Class *Chondrichthyes*: cartilage fish (850 living species)

- Sharks, skates and rays
- Skeletons composed of flexible cartilage
- Skin feels like sandpaper made of small scales embedded in the skin
- Majority live in salt water (some fresh water)
- Mouth includes upper and lower jaws armed with three rows hard teeth angled inward, as teeth are lost or broken are replaced from the row behind
- Are denser than water, have to keep moving to stay afloat, if they stop swimming they slowly sink
- Have three well-developed senses to detect their prey
- 1. acute sense of smell
- 2. ability to sense electric currents in water (muscle movement of prey)
- 3. Have a lateral line system used to detect changes in pressure caused by a fish swimming nearby
- The largest shark whale shark (45 feet) and largest ray is the manta ray (fin span is 20 feet); feed on plankton

Class *Osteichthyes:* bony fish

- 95% of all fish
- Examples are goldfish, trout, salmon, catfish, tuna
- Skeleton composed largely of bone and covered by scales
- Have a swim bladder: gas filled sac used to control buoyancy, aka gas bladder
- Vision is important, most have color vision, bright colors signal potential mates and rivals

**Amphibians**

- "Double Life"
- Animals that spend part of their lives in water and part on land
- includes frogs, toads, salamanders, and newts
- Characteristics of amphibians
- are ectothermic
- except caecilians, all have legs
- gas exchange occurs across the thin, moist skin
- most live in moist environments
- do not lay water tight eggs and must reproduce in water
- external fertilization (except some salamanders)

Differences between frogs and toads

- Frogs have smooth, moist skin, and usually live near water
- Toads have rough, dry skin and can live far from water but must return to water to reproduce
- Some toads can be poisonous and also some frogs

Metamorphosis of a frog

- Eggs laid in a wet or moist environment

- Young tadpoles emerges and breathes with external gills
- After a period of time, the tail and gills go away and lungs and legs grow
- Tadpoles are herbivores and the adult frog is carnivorous with large mouths and sticky tongues
- Frogs and toads have specialized hind limbs for jumping

Where they live, habitat of frogs and toads

- some live completely in water
- some live part time in water and part time in land
- -some live as adults in trees
- During cold months frogs and toads become inactive: frogs bury themselves in mud at bottom of a lake, toads burrow soft moist soil; this period of inactivity is called hibernation