Frogs
Class Amphibia

Amphibia is derived from Greek words which mean "on both sides of life". Part of their life is spent in water and part is spent on land "Double Life".
Includes: frogs, toads, salamanders, & caecilians (se sil i anz)
size range: tiny frog of Cuba 1/2 inch in length to giant salamander over 5 feet
none are marine
They are ectothermic (cold blooded) - not able to maintain a constant body temperature; body temp. varies with the temp. of the environment

Classification:
3 orders based on body shape and type of limbs:
1. Order Apoda (AP uh duh) - Greek word meaning "without feet"
contains caecilians (comes from Latin word meaning "blind"
strictly underground creatures - totally blind as adults
wormlike - lack limbs
2. Order Caudata (kaw DAH tuh) - from Latin "having a tail"
contains: salamanders, newts, and sirens
often mistaken for lizards
largest living amphibian - Japanese giant salamander (5 ft.)
3. Order Anura (uh NOOR uh) - Greek meaning "without tail"
contains: frogs and toads
3 groups of anurans: (Genus)
A. Rana - frogs
remain near water
smooth, shiny skin that dries easily
B. Bufo - toads
strictly land dwellers (enter water only to mate)
rough, dry, warty skin
C. Hyla - tree frogs
usually smaller than frogs and toads and have enlarged, sticky discs at the end of each toe
leopard frog (Rana pipiens)

Movement: three types of muscle
Body Covering:

- **skin**

  3 functions of amphibians' skin:
  1. body covering
  2. protection
     a. secretes poisonous substances
        - may just taste bad
        - may be strong enough to burn
        - may be fatal
        Arrow poison frog
        Read page 456
        (To be effective, the toxin must enter the bloodstream directly; digestive enzymes destroy the toxin, making it safe to consume poisoned game.)
  b. camouflage
     - chromatophores
  3. respiration

Support:
- **endoskeleton**

Nutrition:

- Flips out its long sticky **tongue** & snatches prey.
  Then it flips the tongue and insect into its mouth.
- **teeth**: 2 sets in upper jaw
  - **maxillary** (MAK suh lehr ee)
  - **vomerine** (VO mur in)
  - teeth are not used to chew or bite food
  - function - helps to hold prey
  To swallow: uses blinking **eyes** to help force food down the gullet

path of food:
- esophagus
- stomach (pyloric valve)
- small intestine (duodenum to ileum)
- colon (large intestine)
- **cloaca** (klo AY kuh) - the cavity which collects and stores wastes from both the colon and kidneys
- **anus**

  two glands which are part of the frog's digestive system:
  - **liver** - largest organ in the frog
  - produces bile (stored in gallbladder)
  - **pancreas**
  - **mesenteries** - transparent membranes that surround body organs and attach them to the body wall

Respiration:

- 4 structures which amphibians use to **obtain oxygen** -
  1. **gills** - used during the aquatic stage
  2. **lungs** - used by terrestrial adults
     - lack a rib cage and diaphragm (fill their lungs by forcing air into them by lowering the floor of
its mouth and swallowing air)

(3) the lining of the adult's mouth and throat
has an abundant blood supply and can exchange
 gases
(4) the skin
used especially in lungless amphibians
also while an amphibian is underwater for a long
 period of time
 skin accounts for a great part of respiration

Circulation:
  3-chambered heart
  1 ventricle (pumps blood to all parts of the body)
  2 atria
     left atrium - oxygenated blood from lungs
     right atrium - deoxygenated blood from body
  dorsal aorta - largest blood vessel in the frog
  vena cava - largest vein in the frog

Excretion:
  kidneys (filter wastes and excess water and concentrate them
          in the form of urine)
  renal arteries / renal veins
  ureter
  urinary bladder
  cloaca
  anus

Responses:
  2 major divisions of the nervous system:
  (1) central nervous system (CNS)
       brain and spinal cord
  (2) peripheral nervous system (PNS)
       cranial nerves
       spinal nerves
       sensory organs
          eyes - nictitating membrane - "third eyelid"
          ear - tympanic membrane - "eardrum"

Reproduction:
  external fertilization
  male - testes produce sperm
  female - ovaries produce ova (eggs)
  mating process:  male crocks to attract a mate
                  she responds when her eggs are ripe
                  amplexus - in the water, the male clasps
                  the female from behind which
                  stimulates the release of eggs
                  (Latin - "embrace"
                  male covers the eggs with sperm
                  both parents usually abandon the eggs
Although some female toads lay their eggs one at a time, most toads lay them in a long string, which they spread over plants in the water. Frogs lay eggs in clusters, which are usually anchored to vegetation. Some tropical species attach their eggs to the underside of leaves growing over water. As the eggs hatch, the tadpoles drop into the water. Even though some species lay thousands of eggs at a time (the arrow-poison frog lays a single eg), many eggs are eaten by larger water animals, and therefore only a few reach maturity. The eggs are hatched in 2 to 25 days, depending on the water temperature; low temperatures slow down development.

The American white-lipped frog lays its eggs in a hole near a pond, then whips the jellylike substance into a foam in which the tadpoles live until rain washes them into the pond. The Surinam toad of South America lays its eggs and then quickly loops around to catch them on its back; they remain in cavities on the female's back throughout their larval state. The male midwife toad of western Europe carries the eggs wound around his hind legs. When the eggs are ready to hatch, the male toad enters water and the tadpoles swim away. After the female Darwin's frog lays eggs, the male frog picks up the eggs with his tongue and carries them around in his vocal sac, where they hatch and the young develop. A few species lay their eggs on land under rocks, logs, or dead leaves. These amphibians, such as the barking frog and the cliff frog that live on rocky cliffs in Texas, have no tadpole stage; they hatch from the eggs and begin life as a terrestrial animal.