I. List the major characteristics of Amphibians
   A. Tetrapods
   B. Ectothermic
   C. Heart with sinus venosus
   D. Moist glandular skin with cutaneous respiration
   E. External gills on larval forms
   F. Eggs with jellylike covering
   G. Stapes (columella) with a dorsolateral orientation
   H. Short straight ribs
   I. Pedicellate teeth
   J. Green rods
   K. Levator bulbi muscle
   L. Forced pump respiration (positive pressure)

II. For each of the amphibian orders list and describe the main characteristics. Make sure you know what types of organisms fit in each order.

**Gymnophiona**
   A. Limbless
   B. Paired tentacles
   C. Annular rings
   D. Dual jaw closure

**Urodela**
   A. Heterochrony - Paedomorphosis
   B. Courtship dances

**Anura**
   A. Loss of tails
   B. Anterior tongue attachment
   C. Skeletal modifications for jumping
      1. Ilium directed anteriorly
      2. Sacral vertebra with lateral projections (diapophyses)
      3. Urostyle
      4. Fusion of limb bones - Radioulna & Tibiofibula
      5. Elongation of tarsals and phalanges
III. What is chytridomycosis and how is it affecting frogs?

Chytridiomycosis is a fungal disease that infects the skin of frogs causing the skin to thicken and prohibiting gas exchange. This disease is leading to a decline in many frog species around the world.

IV. Urodelans have a very generalized amphibian body plan while Anurans and Gymnophionans have very specialized body plans. What type of locomotion is each adapted for and what modifications have occurred to make them efficient in their respective modes of locomotion.

Gymnophiona - Fossorial locomotion: long slender limbless body, dual-jaw closure allowing for a slender head
Anura - Saltatorial (jumping) locomotion: numerous skeletal adaptations for jumping

V. List the characteristics of clade Amniota.
   A. Amniotic egg
   B. Dry Skin with Epidermal Scales (Keratinized)
   C. Digits Ending in Claws
   D. Internal Fertilization, Males Typically with a Penis
   E. Direct Development, No Larval Forms
   F. No External Gills, Respiration via Lungs (negative pressure)
   G. Ribs Usually Connected Ventrally
   H. Single Occipital Condyle

VI. Draw and label an amniotic egg. Describe the primary function of each of the four characteristic membranes of an amniotic egg.

- Chorion - gas exchange
- Allantois - waste storage/gas exchange
- Yolk Sac - nutrients
- Amnion - protection from desiccation and shock
VII. What is the primary advantage of amniote eggs.

It allows amniotes to lose their ties to standing water; they don’t need to lay their eggs in water.

VIII. Non-avian Reptiles
For each of the Reptilian orders list and describe the main characteristics. Make sure you know what types of organisms fit in each order.

**Testudines**
A. Anapsid Skull
B. Body Encased in a Shell - Dorsal Carapace and Ventral Plastron
C. Pectoral and Pelvic Girdles are Inside the Rib Cage
D. Tothless: tomium is a keratinized cutting edge forming the turtle “beak”

**Sphenodonta**
A. Two Living Species in New Zealand
B. Well-developed Parietal Eye
C. Gastralia
D. Uncinate Ribs
E. Teeth on Palatine Bone (two rows of teeth in upper jaw)
F. No Tympanum/Middle Ear

**Squamata**
A. Loss of Quadratojugal Arch
B. Kinetic Skulls
C. Males with Paired Copulatory Organs
D. Two Modes of Tooth Attachment: Acrodont - irreplaceable, Pleurodont - replaceable
E. Caudal Autotomy
F. Skin is Shed

**Crocodilia**
A. Nostrils at Tip of Snout
B. Heavy Dorsal Osteoderms
C. Laterally compressed tail
D. Complete Secondary Palate
E. Gizzard
F. Foramen of panizza
G. Complex Courtship and Maternal Care

IX Describe the difference between anapsid, diapsid and synapsid skulls. Which taxa within clade Amniota have each skull type.