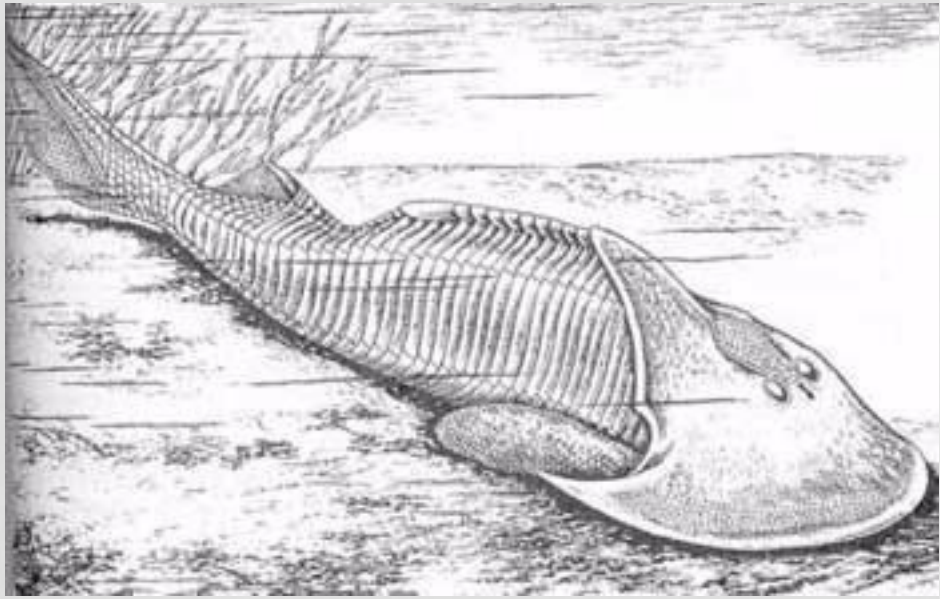

VERTEBRATES

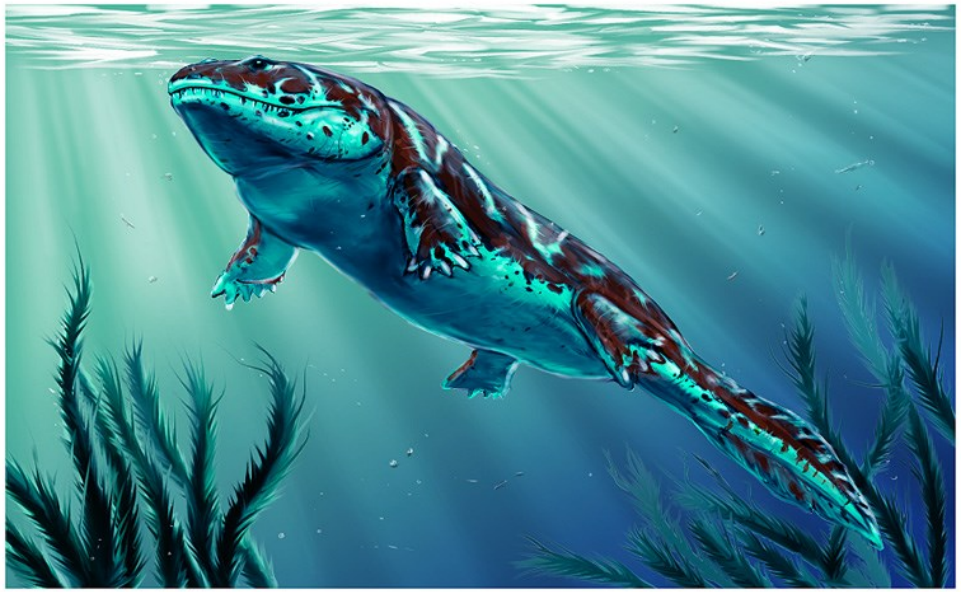
# EARLY HISTORY

- Vertebrates: A subphylum of the Phylum Chordata
- Early vertebrates include jawless fish (Class Agnatha), which appeared during the Cambrian (541-485 Mya)
- Fish with jaws followed during the Silurian (444-419 Mya)
  - Allowed fish to grasp, cut, and hold food



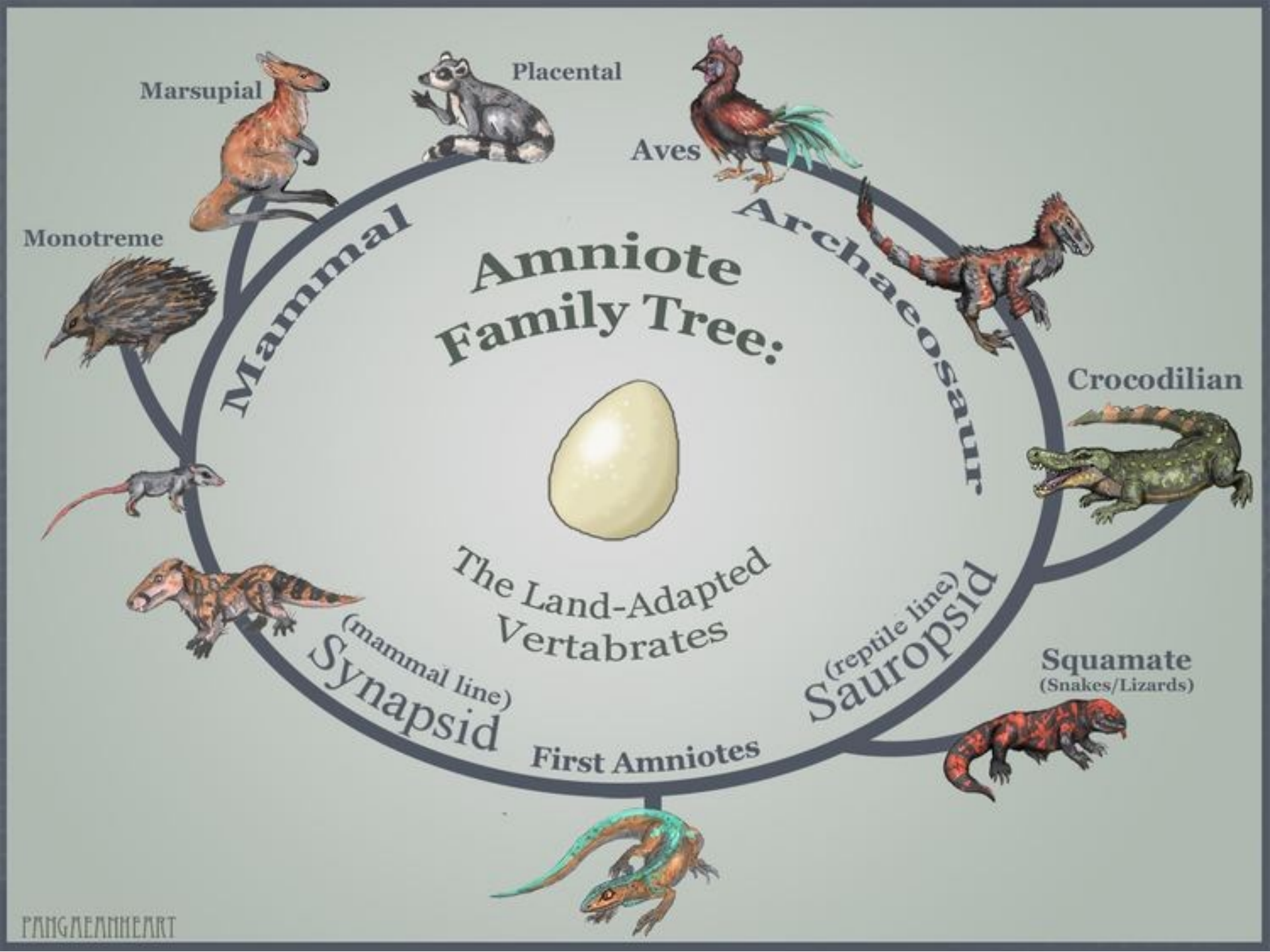
# EARLY HISTORY

- Land-dwelling amphibian vertebrates that walk on all four legs (tetrapods) emerged during the Devonian (419-359 Mya)
  - Evolved from crossopterygian, muscular lobe finned fish
- Early amphibians shared similarities to fish (e.g., Ichthyostegans)

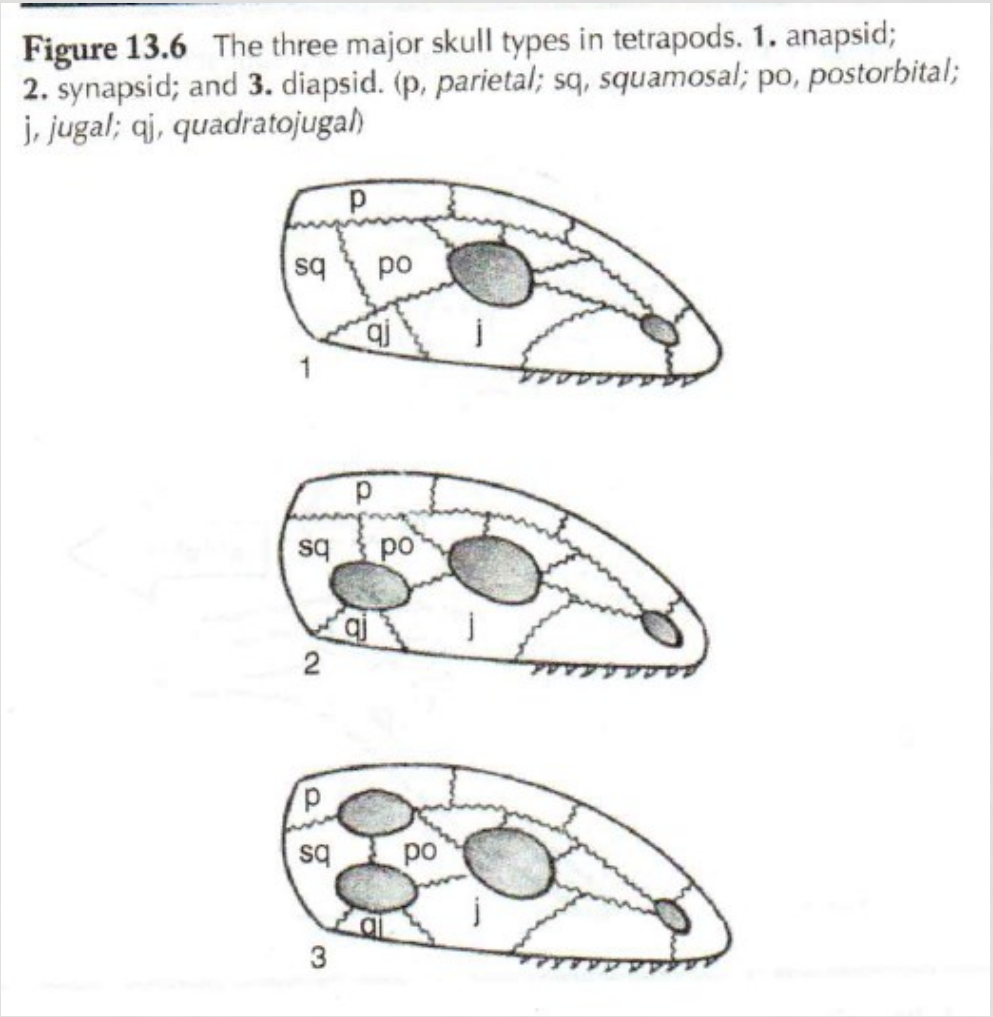


# AMNIOTES

- Amniotes (vertebrates laying amniotic eggs) evolved from amphibians and formed into two main branches during the Carboniferous Period (359-299 Mya)
  - Reptilia (cold-blooded, Mississippian-Recent)
    - Anapsida (e.g., turtles), diapsida (e.g., lizards and snakes), and archosauria (diapsids…e.g., crocodiles, dinosaurs, and birds)
  - Synapsida
    - widespread during Permian (299-252 Mya), and some shared skeletal traits with mammals!


Amniote Family Tree:
The Land-Adapted Vertabrates
Mammal
Marsupial
Placental
Monotreme
Archaeosaur
Aves
Crocodilian
(reptile line)
Sauropsid
Squamate
(Snakes/Lizards)
(mammal line)
Synapsid
First Amniotes
PANGAEANHEART

# SYNAPSIDS, ANAPSIDS, DIAPSIDE



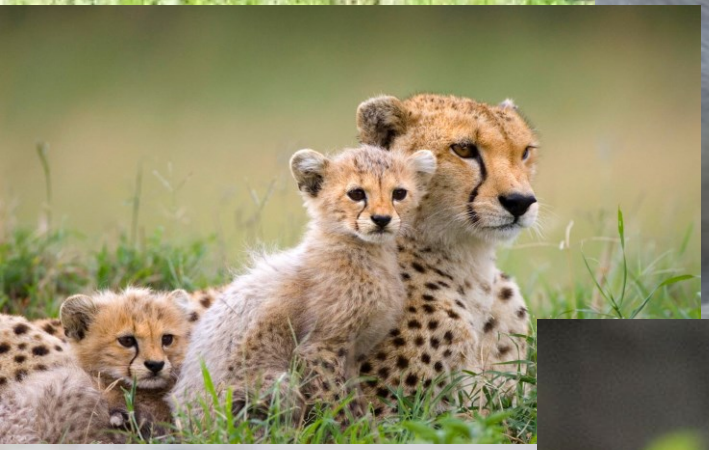

- Identify anapsids, diapsids, and synapsids by the <u>position and number of openings</u> (temporal fenestra) on side of skull

# DINOSAURS (DIAPSID AMNIOTES)

- Existence: Late Triassic (237 Mya) – Late Cretaceous (66 Mya)
- Key Features: cold-blooded, large tail (for balance), fenestrae (to lighten skull)
- Two Groups:
  - Ornithischia (bird-like pelvic structure)
    - Plant-eaters (e.g., Triceratops)
  - Saurischia (reptile-like pelvic structure)
    - Plant-eating group (e.g., Apatosaurus)
    - Meat-eating group (e.g., Tyrannosaurus rex)
    - Birds are descendents of Saurischian therapods

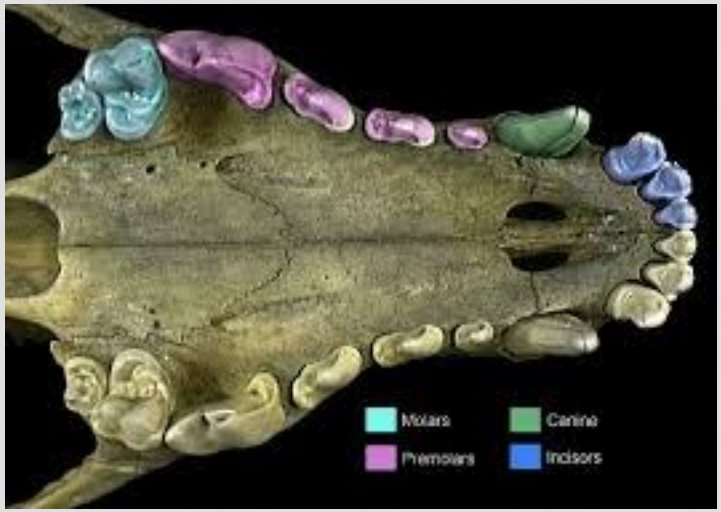
# CLASS MAMMALIA

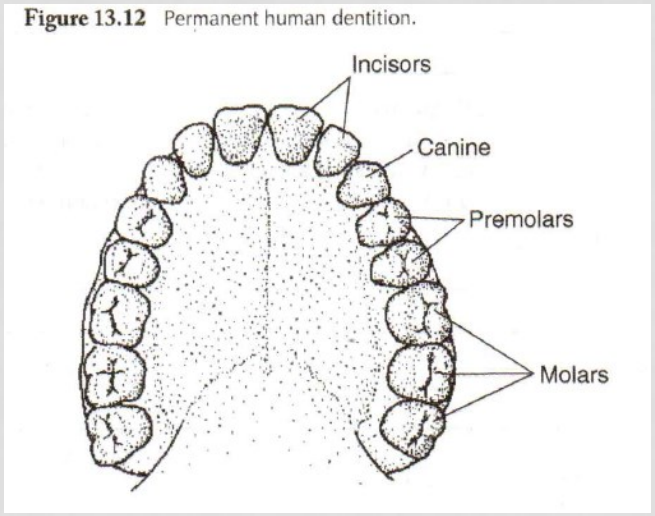
- Existence: Triassic (252 Mya) to Recent
- Key Features: fur or hair (warm-blooded), 4-chambered heart, mammary glands used in suckling young
- Early mammals were small and shrew-like descendants of mammal-like reptiles
- Distinguish from reptiles through:
  - Dentary bone in jaw
  - Larger braincase
  - Double knob of bone forming the articulation between the skull and first cervical (neck) vertebra
  - Lack of ribs in neck vertebra
  - Longer ribs attached to breastbone (sternum)



# TEETH OF MAMMALS

- Teeth reveal what food the animal ate and information about the animal's behavior
- Most mammal's are heterodont (differentiated teeth)
  - Incisors: cutting, grasping, and gnawing
  - Canine: threatening, fighting, and defense
  - Premolars & Molars: Break down food



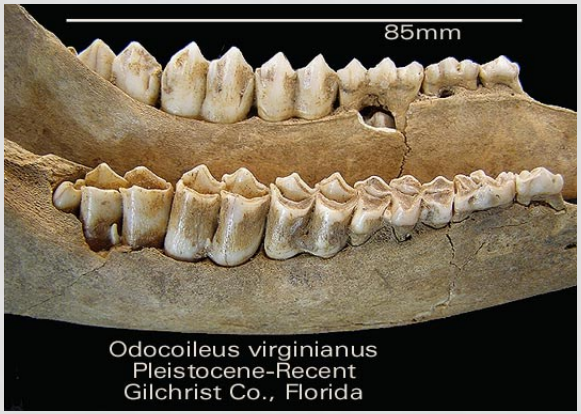



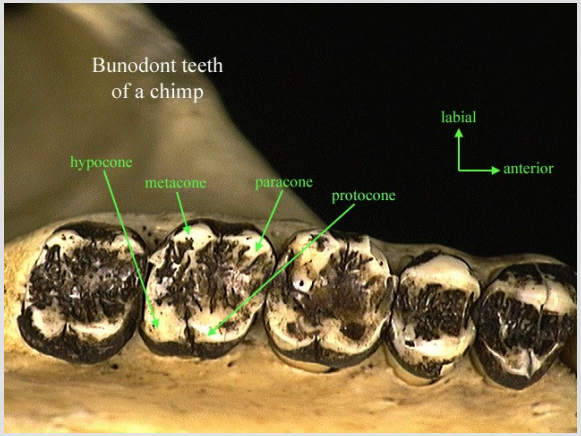
# TEETH OF MAMMALS

- **Order Proboscidea**: Mammals with modified incisor teeth that form tusks (e.g., elephants, mammoths, mastodonts)
- **Carnissials**: laterally compressed cheek teeth with sharp, bladelike cutting edges used for shearing (see photo)
- Broad and flat premolars and molars to grind and break down vegetation
  - Troughs (where dentine reside) and peaks (where enamel reside) add roughness

# TEETH OF MAMMALS

- Deep roots and long crowns provide sturdiness for teeth of **herbivores** and are termed **hypsodont (e.g., horse)**
- Concentric half-moon shaped teeth making sideways chewing effective are termed **selenodont (e.g., deer)**
- **Omnivores** have bladelike incisors, less prominent canines (usually), and **bunodont** premolars and molars (low cusps, short crowns, and well-developed roots)



# ASSIGNMENT

- Pages 246-252, questions 1-15
- Skip question 6ii on page 248