- **Deuterostomia** (superphylum)

  First opening in the blastula becomes the anus, and blastula is cleaved radially.

  - **Ambulacraria** (phylum)

    Standard deuterostome (radially cleaved triploblast) blastula develops into a dipleura larval form

    - **Echinoderms** (phylum)
      Sea stars, sea urchins, sea cucumbers, sea lilies
    - **Hemichordates** (phylum)
  - **Chordata** (phylum)

    "During some period of their life cycle, chordates possess a notochord, a dorsal nerve cord, pharyngeal slits, and a post-anal tail: these four anatomical features define this phylum."

    - **Cephalochordata** (subphylum)
      Lancelets
    - **Olfactores** (clade)
      Pharynx develops to include sensory and respiratory functions
      - **Tunicates** (subphylum)
      - **Vertebrates** (subphylum)
        Possess a vertebral column - a stiffer structure with jointed segments (vertebra) that replaces the notochord.
        (the hierarchy gets a bit messy here; basically it's jawed vs non jawed animals)
        - **Agnatha** (superclass)
          Lampreys and Myxini (hagfish)
          Many extinct species
        - **Gnathostomata** (superclass)
          Jawed vertebrates
          - **Placodermi †** (class)
            Armored fishes
          - **Eugnathostomata** (superclass)
          - **Acanthodians †** (class)
          - **Chondrichthyes** (class)
            Cartilaginous fish
            - **Elasmobranchii**
              Sharks, rays, skates, sawfish
            - **Holocephali**
              Includes the Australian ghostshark, believed to be the slowest evolving vertebrate.
        - **Osteichthyes** (class)
          Bony vertebrates
          - **Actinopterygii** (class)
            Ray-finned fish
            - **Cladista**
            - **Actinopteri**
              - **Chondrostei**
                Primarily cartilaginous fish that also show some ossification. The cartilage-ness is believed to be derived instead of elementary; ancestors of these species developed bones just like other Osteichthyes.
                Have a heteroceral tail and no scales just like sharks and other Elasmobranchii.
                - **Acipenseridae**
                  Sturgeon, 27 species. Have 5 rows of scutes instead of scales. Sturgeons are anadromous (live in the sea, migrate to freshwater to mate). Toothless benthic suction feeders. Sturgeon are sometimes seen leaping completely out of the water and splashing down which can be heard a mile away and it's unclear why they do this.
                - **Polyodontidae**
              - **Neopterygii**
          - **Sarcopterygii** (class)
            Lobe-finned fish
            This divergence of lobe finned fish from ray finned fish happened during the Devonian, approx 450 mya
            - **Onychondontida †** (order)
            - **Actinistia** (order)
              Coelacanth
            - **Dipnomorpha** (infraclass)
              - **Porolepiformes †** (order)
              - **Dipnoi** (subclass)
                Lungfish
            - **Tetropodomorpha** (infraclass)
              Tetrapods and extinct closest relatives
              - **Osteolepidida** (superorder)
                - **Tetrapods** (order)
                  Classification gets messy and largely hypothesis based here; the important features are stem tetrapods, amphibians, and amniotes, so that is how we present them here.
                  - **Stem Tetrapods** "Branch" families of tetrapods with no significant evolutionary diversity or impact.
                  - **Lissamphibia** Amphibians
                  - **Amniota** Amniotes, including reptiles and mammals
                    - **Synapsida** ∈
                      Mammals and relatives, which have a temporal fenestra and differentiated teeth that sets them apart from sauropsids.
                    - **Sauropsida** ∈
                      Everything else; lizards, snakes, crocodiles.