- **Dinosauria**

  Dinosaurs and modern-day birds.

  - **Ornithischia** †

    Bird hipped dinosaurs, based on the structure of the pelvis and hips; in particular, the pubis points backward along the ischium. Ironically, this group does not contain modern day birds.

    - **Heterodontosauridae** †
    - **Thyreophora** †

      Armored dinosaurs, mostly quadrupeds

      - **Ankylosauria** †
      - **Stegosauria** †
    - **Neornithischia** †
      - **Ornithopoda** †

        Evolved chewing with skull flexibility and many teeth. They had a mandibular fenestra.

        - **Hadrosauridae** †

          Duck billed dinosaurs, large quadruped herbivores whose teeth merged together into "dental batteries".
        - **Iguanodon** †

          Large herbivores with distinctive thumb spikes. "Together with Megalosaurus and Hylaeosaurus, it was one of the three genera originally used to define Dinosauria." Originally believed to be quadrupedal with the thumb spike as a horn nose.
      - **Marginocephalia** †

        Characterized by cranial growth

        - **Pachycephalosauria** †

          Etymology - "thick skulled lizards". Small (2-3 meters tall) bipeds with a domed or knobby skull. They also had remarkably good vision and smell.

          The main theory for the domed heads is that they headbutted like modern day rams or bison, and this is supported by "vertebral articulations" resulting in a rigid spine and strong neck muscles. However, evidence shows that the pachycephalosaurs didn't hold their spine in a straight shape and a domed head would make direct hits hard, so there are also theories that the ram was used just for defense or the pachycephalosaurs butted each others' flanks instead.

          More recent analysis shows that many of the domes have signs of experiencing osteomyelitis, an infection of the bone from penetrative trauma or injury to the flesh covering the bone. The incidence of this evidence is so regular that people believe this means the pachycephalosaurs used their dome heads in intra species combat.
        - **Ceratopsia** †

          Herbivorous and beaked dinosaurs with a neck frill and often horns. In addition to defense, the frills may have been used for display or heat regulation. Rostral bone in the upper jaw is unique to Ceratopsids

  - **Saurischia**

    Lizard hipped dinosaurs; the pubis points perpendicularly forward away from the ischium.

    - **Theropoda**

      All bipedal, mostly carnivorous dinosaurs.

      - **Ceratosauria** †

        Shortened forelimbs and elaborately horned skulls.
      - **Tetanurae**

        Stiff tailed Theropods which diverged from the Ceratorsaurs in the late Triassic. Shared features include air sac based lung systems that are similar to those of modern day birds and an advanced circulatory system. "Other tetanuran characterizing features include the absence of the fourth digit of the hand, placement of the maxillary teeth anterior to the orbit, a strap-like scapula, maxillary fenestrae, and stiffened tails."

        - **Megaraptora** †

          Hand snatchers. Group with a very controversial placement in the tree of life.
        - **Carnosauria** †
          - **Spinosauridae** †

            Large bipedal carnivores with crocodilian like skulls and a large back sail. Includes the species Baryonyx and Spinosaurus.

            Lots of evidence that they were semiaquatic. Their teeth were long, conical, and not serrated which is good for grabbing hold of slippery prey such as fish instead of cutting through flesh. The tips of their jaws fan out ("rosette") and the nostrils are higher on the snout, suggesting they hunted with their snout semi submerged. Their snouts also have openings similar to those on the snouts of crocodiles to house pressure receptors, which greatly enhance their ability to detect movement in water.
          - **Allosauroidea** †
        - **Coelurosauria**

          Feathered Theropods

          - **Tyrannosauroidea** †

            Tyrannosaurus and close relatives
          - **Ornithomimosauria** †

            "Ostrich mimics".
          - **Maniraptora**
            - **Oviraptorosauria** †
            - **Paraves**

              Synonymous to Eumaniraptora up to classifications of some extinct branch species.

              - – **Dromaeosauridae** †

                The family that includes the highly intelligent and probably feathered raptors such as the Velociraptor.
              - **Troodontidae** †
            - **Avialae**

              Birds
- **Sauropodomorpha** †

  Herbivore dinosaurs with long necks, small heads, long tails.

  - **Sauropoda** †

    Huge sauropods