The Vertebral Column
In addition to the Cornell power point presentation, pp 95-103 stapled lab packet, the color sheets, and the exercise 8 Review Sheet, please view the online video (at www.t1lara.weebly.com) titled: “Vertebral Column.”

The online video slowly reviews through the major features and bone markings of each type of vertebrae.

As you watch the video, pause the video and color code your drawings, THEN, complete the exercise 8 Review Sheet. Review your notes, pp 95-103, and the color sheets to help you answer the exercise 8 Review Sheet.
The spine or **vertebral column** provides support for the head and body and is important in maintaining an erect posture while standing and sitting.

In addition, it protects the spinal cord.
During development the vertebral column is formed by 33 individual vertebrae (singular = vertebra), however as a result of bone fusion, the adult spine has only 26 bones and is divided into 5 regions.
The Vertebral Column
Reviewing the lateral view of the vertebral column:

- The neck
  - 7 cervical vertebrae
- The upper back
  - 12 thoracic vertebrae
  - Each articulates with one or more pair of ribs
- The lower back
  - 5 lumbar vertebrae
Remembering common mealtimes for breakfast, lunch, and dinner (7 A.M., 12 noon, & 5 P.M.) may help you to remember the number of bones in each region.
The Sacrum and Coccyx

- 5 fused vertebrae of the sacrum
- The fifth lumbar vertebra articulates with the sacrum
- The sacrum articulates with the coccyx
- 4 fused vertebrae of the coccyx (tail bone)
Structural changes occur during the development of the vertebrae. During fetal life, the initial curvature of the vertebrae is C shaped and concave anteriorly, this is primary curvature and is retained by the thoracic and sacral portions of the vertebral column.
During infancy and childhood the cervical and lumbar concave posteriorly. These are secondary curvatures and are adaptations to support the head and torso in an upright position.
Abnormal Curvatures
The vertebral column has four normal curvatures, but it can also become abnormally curved.

Scoliosis is an abnormal lateral deviation of the vertebral column, which is normally straight from side to side.
Scoliosis Video
- **Lordosis** is an exaggerated lumbar curvature and results in a swayback appearance.
- **Kyphosis** is an exaggerated thoracic curvature that often gives an individual a hunchback appearance.
Compression Fractures
- When osteoclasts outpace osteoblasts in osteoporosis fractures become more likely.

- The vertebrae bear the weight of our upright posture via cartilaginous joints. That pressure can result in compression fractures to the body of a vertebra when the bone is weakened through osteoporosis.

- This is common in the elderly.
The Intervertebral Disks
- Intervertebral Discs:
  - Are pads of fibrocartilage
  - Separate the vertebral bodies
  - Absorb shocks while providing spine flexibility
The intervertebral disc has a tough outer fibrous tissue that encloses a fluid cushion. Over time, the fibrous annulus can tear and permit the viscous liquid core to herniate outwards.

Mistakenly called a “slipped disc,” it is actually a herniated disc. This back lesion can lead to pain and numbness.
The Cervical Vertebrae
- The Cervical Vertebrae forms the neck portion of the vertebral column.
- The **Atlas** ($C_1$) Articulates with the occipital condyles of the skull
- The atlas has no body or spinous process
- The Cervical Vertebrae, the Axis ($C_2$) supports the atlas.
- The Axis has a heavy spinous process to attach muscles of the head and neck.
The axis and atlas bodies fuse during development to form the **dens**.
When contrasting C1 and C2 with the other vertebrae the atlas holds up the "globe" (the head), just as Atlas held up the world in Greek mythology.
The dens of the axis looks like a dunce cap. (*Dens* is the Latin word for tooth.)
The manner in which the cranium’s occipital condyles glide on the atlas’s superior articulating surfaces allows us to nod “yes.”
In contrast, the rotation of the atlas around the dens of the axis permits us to shake our head “no.”

The “globe” rotates on its axis.
- The typical cervical vertebrae C3-C7 are the smallest and lightest.
- The vertebral foramen is triangular and the transverse process contains foramina through which the vertebral arteries pass superiorly to the brain.
- A whiplash injury to the neck is the result of hyperextension.
The Thoracic Vertebrae
• The larger 12 thoracic vertebrae (T1-T12) have a heart shaped body.
• They have a facet for articulation with the rib cage.
• The spinous process is long with a sharp downward hook.
The Lumbar
Figure 7–21a The Lumbar Vertebrae.
- **Lumbar vertebrae** $(L_1-L_5)$
  - Largest vertebrae
  - Massive, Oval-shaped bodies
  - Thicker bodies than $T_1-T_{12}$
  - No costal or transverse costal facets
  - Smallest vertebral foramen

(c) Superior view
The **sacrum** forms a joint with the hip bone.
- The **sacrum** is curved, more in males than in females & protects reproductive, urinary, and digestive organs.
- The adult sacrum consists of five fused sacral vertebrae which fuses between puberty and ages 25–30 leaving *transverse lines*. 

![Diagram of sacrum](image)
The Coccyx
The coccyx, also known as the tail bone.

It results from the fusion of 3-5 small, irregularly shaped vertebrae.
The coccyx gets its name because this bone was thought to resemble the beak of the cuckoo bird (coccyx means cuckoo in Greek).