

Lab Exercise 6

Axial Skeleton

Textbook Reference: See Chapter 7

What you need to be able to do on the exam after completing this lab exercise:

Be able to name all the listed bone and bone features on the skull models.

Be able to name the listed parts of the ribcage and sternum on the models in the lab.

Be able to name the hyoid bone, if shown individually.

Be able to name the different vertebrae, if shown individually, as given in this lab exercise.

Be able to name the listed features of each vertebra on the vertebrae in the lab.

Be able to name the sacrum and the listed parts of the sacrum on the models in the lab.

Be able to name the coccyx, if individually shown.

The following tables contain terms that are useful when learning the various bone features. The terms will NOT be on the test. They are simply here for you to use when learning the names of the bone features.

TABLE 6.1 Bone Markings		
NAME OF BONE MARKING	DESCRIPTION	ILLUSTRATIONS
Projections That Are Sites of Muscle and Ligament Attachment		
Tuberosity (too'bē-ros'ī-te)	Large rounded projection; may be roughened	
Crest	Narrow ridge of bone; usually prominent	
Trochanter (tro-kan'ter)	Very large, blunt, irregularly shaped process (the only examples are on the femur)	
Line	Narrow ridge of bone; less prominent than a crest	
Tubercle (too'ber-kl)	Small rounded projection or process	
Epicondyle (ep'i-kon'dil)	Raised area on or above a condyle	
Spine	Sharp, slender, often pointed projection	
Process	Any bony prominence	

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TABLE 6.1 Bone Markings		
NAME OF BONE MARKING	DESCRIPTION	ILLUSTRATIONS
Projections That Help to Form Joints		
Head	Bony expansion carried on a narrow neck	
Facet	Smooth, nearly flat articular surface	
Condyle (kon'dil)	Rounded articular projection	
Ramus (ra'mus)	Armlike bar of bone	
Depressions and Openings		
<i>For Passage of Blood Vessels and Nerves</i>		
Groove	Furrow	
Fissure	Narrow, slitlike opening	
Foramen (fo-ra'men)	Round or oval opening through a bone	
Notch	Indentation at the edge of a structure	
<i>Others</i>		
Meatus (me-a'tus)	Canal-like passageway	
Sinus	Cavity within a bone, filled with air and lined with mucous membrane	
Fossa (fos'ah)	Shallow, basinlike depression in a bone, often serving as an articular surface	

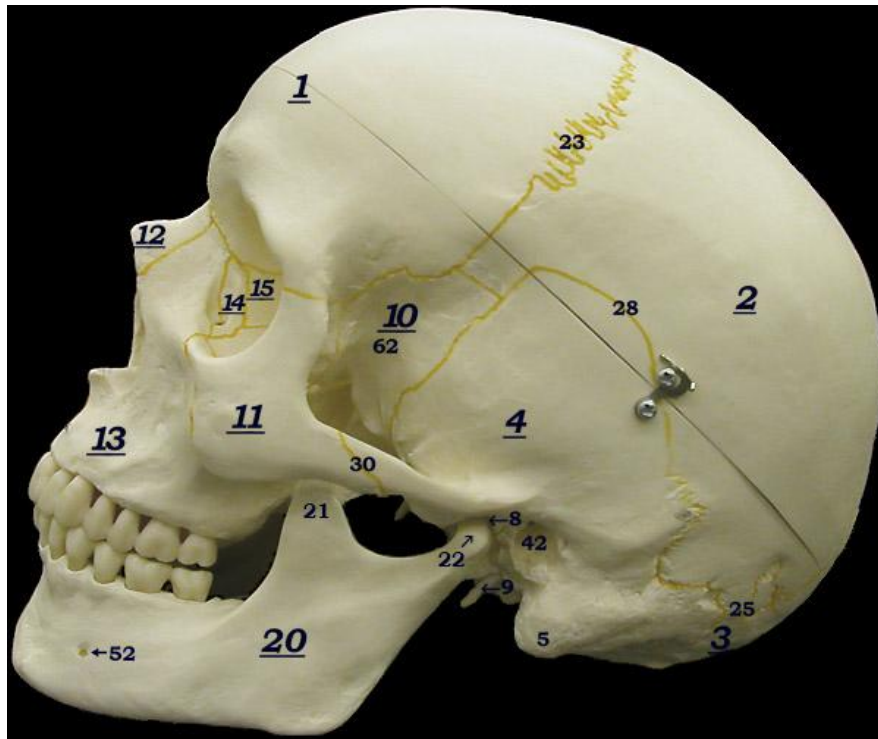
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Axial Skeleton

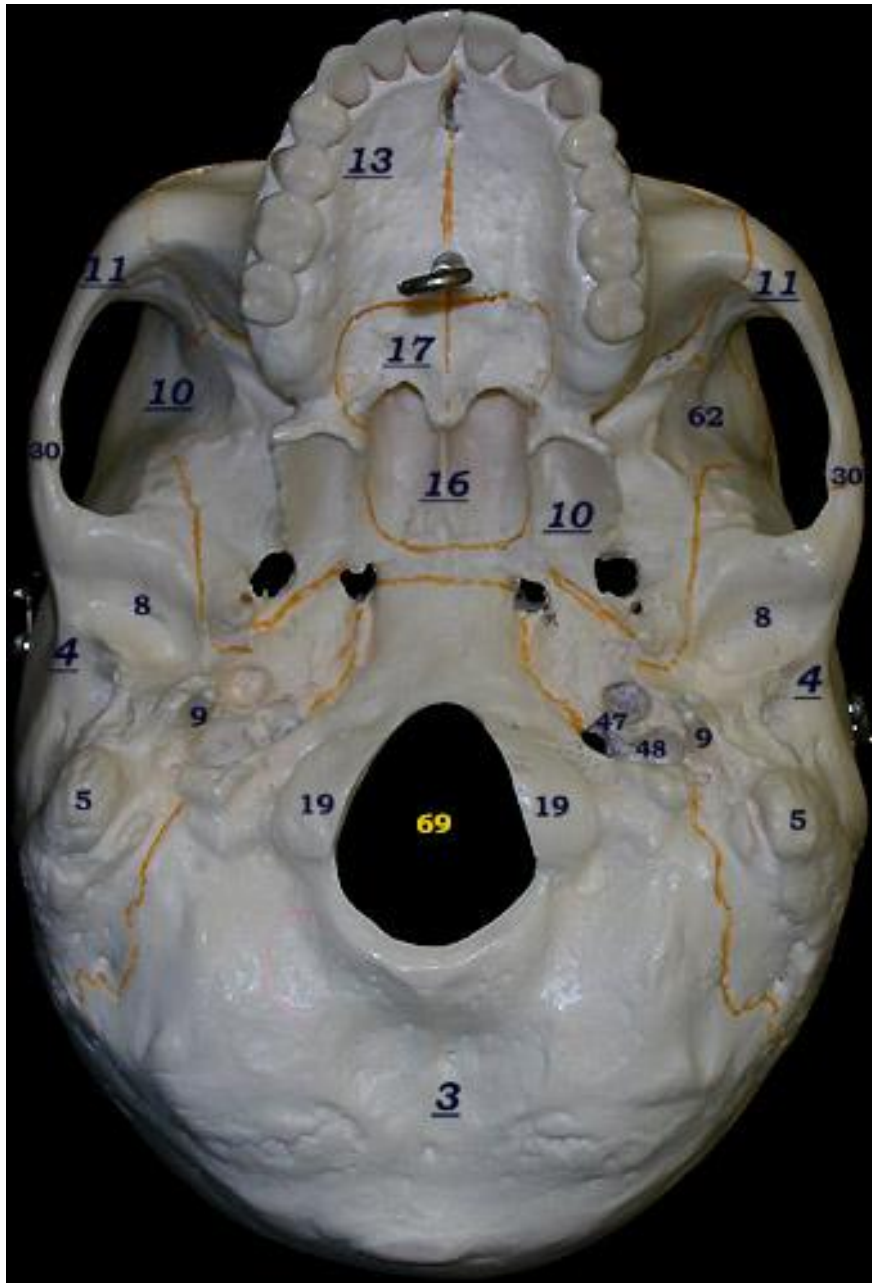
The **axial skeleton** consists of the skull, the ribcage, and the vertebrae.

The Skull

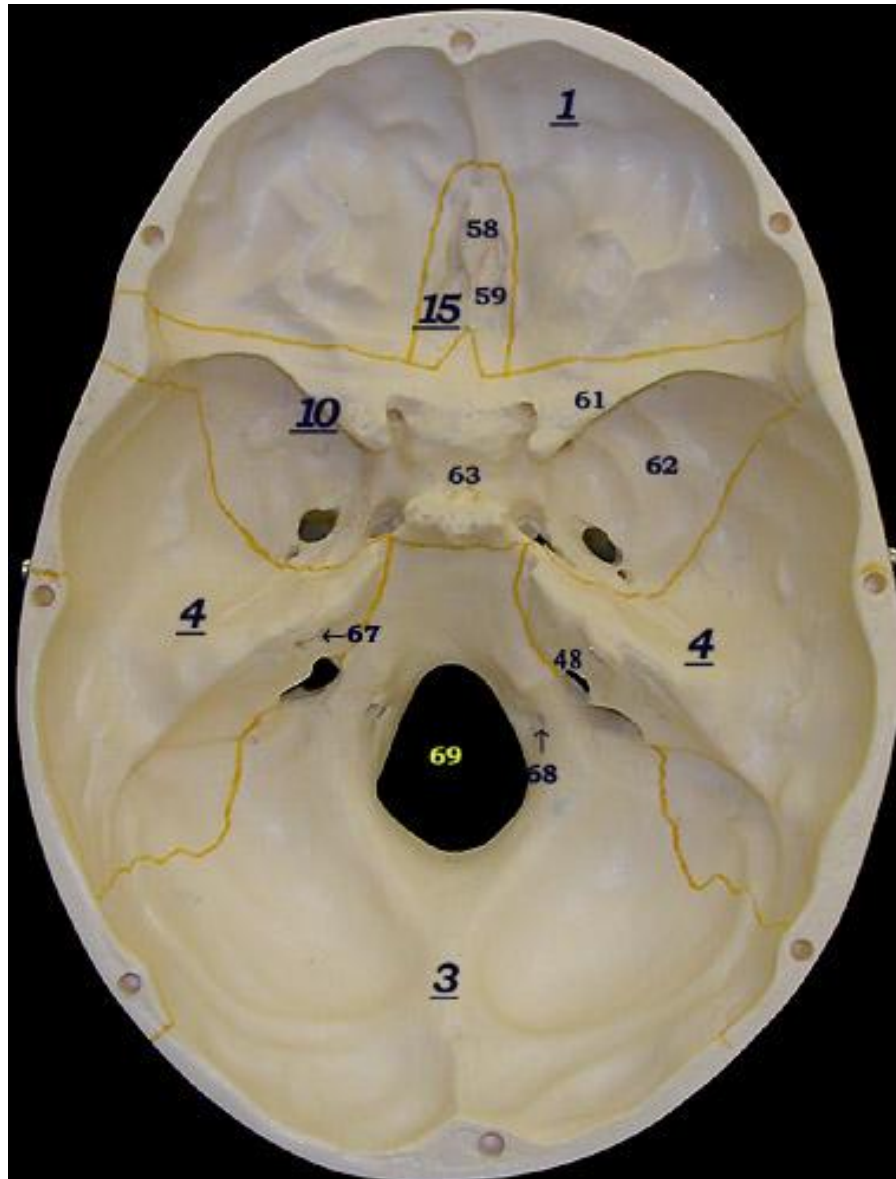
Know the following bones/bone features on the skull models.



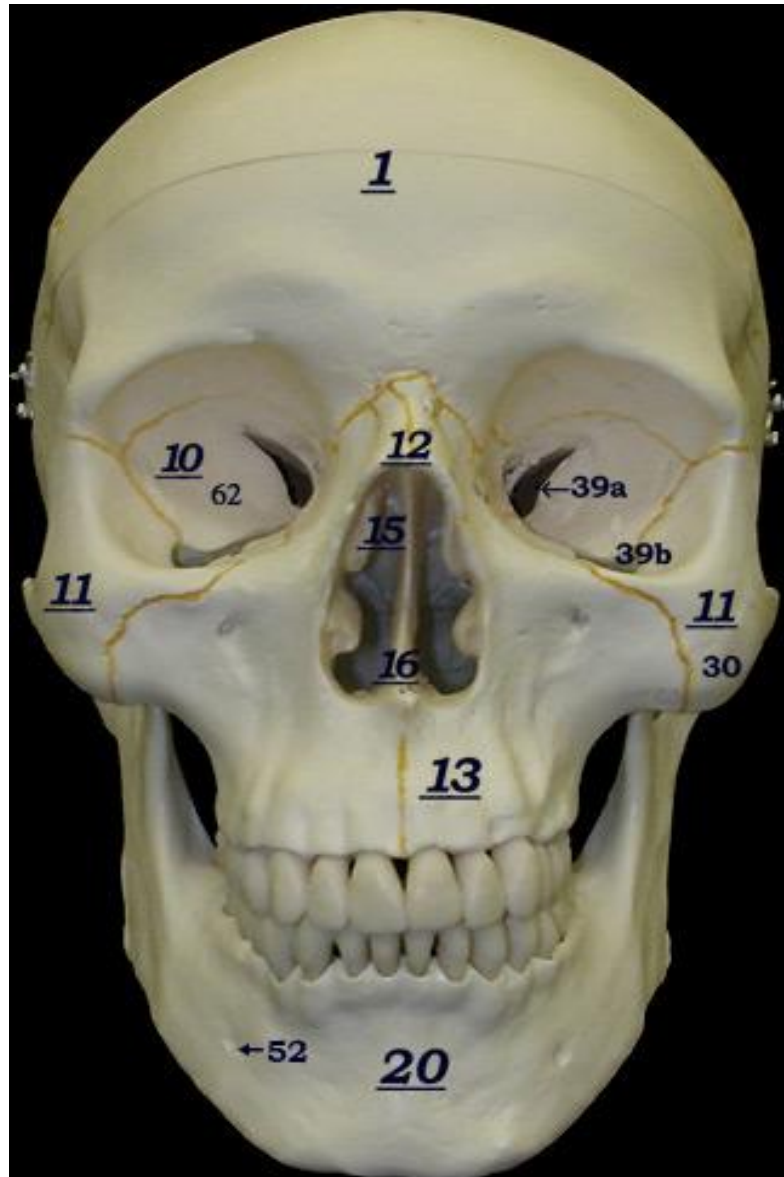
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|---------------------|--------------------|--------------------------------|
| 1. frontal bone | 10. sphenoid bone | 21. coronoid process |
| 2. parietal bone | 11. zygomatic bone | 22. mandibular condyle |
| 3. occipital bone | 12. nasal bone | 23. coronal suture |
| 4. temporal bone | 13. maxilla | 25. lambdoid suture |
| 5. mastoid process | 14. lacrimal bone | 28. squamous suture |
| 8. mandibular fossa | 15. ethmoid bone | 42. external auditory meatus |
| 9. styloid process | 20. mandible | 52. mental foramen |
| | | 62. greater wing (of sphenoid) |



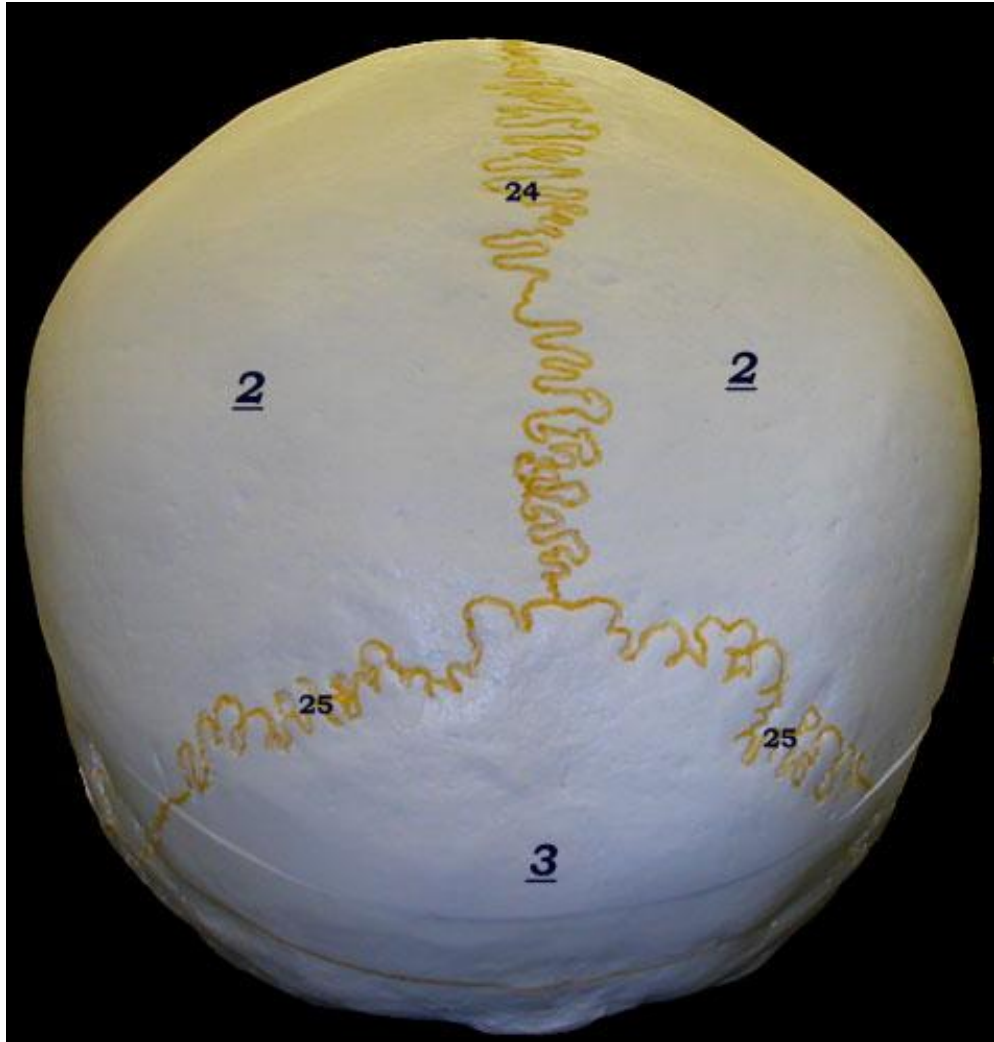
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| 3. occipital bone | 10. sphenoid bone | 19. occipital condyles |
| 4. temporal bone | 11. zygomatic bone | 30. zygomatic arch |
| 5. mastoid process | 13. maxilla | 47. carotid canal |
| 8. mandibular fossa | 16. vomer | 48. jugular foramen |
| 9. styloid process | 17. palatine bone | 62. greater wing |



- | | | |
|-------------------|----------------------|------------------------------|
| 1. frontal bone | 48. jugular foramen | 63. sella turcica |
| 3. occipital bone | 58. crista galli | 67. internal auditory meatus |
| 4. temporal bone | 59. cribriform plate | 68. hypoglossal canal |
| 10. sphenoid bone | 61. lesser wing | 69. foramen magnum |
| 15. ethmoid bone | 62. greater wing | |



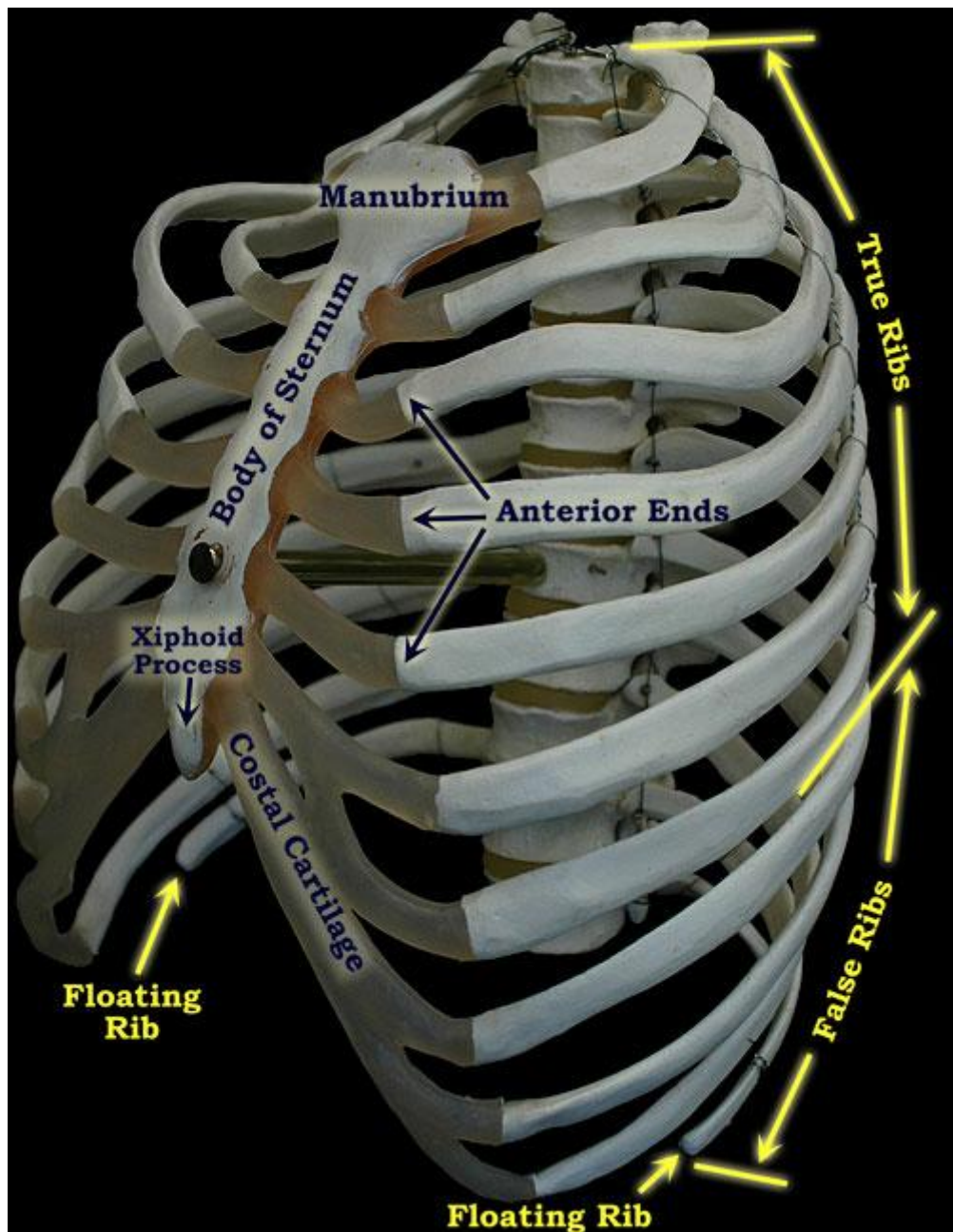
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|--------------------|-------------------------------|-------------------------------|
| 1. frontal bone | 15. ethmoid bone | 39b. inferior orbital fissure |
| 10. sphenoid bone | 16. vomer | 52. mental foramen |
| 11. zygomatic bone | 20. mandible | 62. greater wing |
| 12. nasal bone | 30. zygomatic arch | |
| 13. maxilla | 39a. superior orbital fissure | |



- 2. parietal bone
- 3. occipital bone
- 24. sagittal suture
- 25. lambdoid suture

Rib Cage

Know the following bones of the ribcage on the ribcage model:

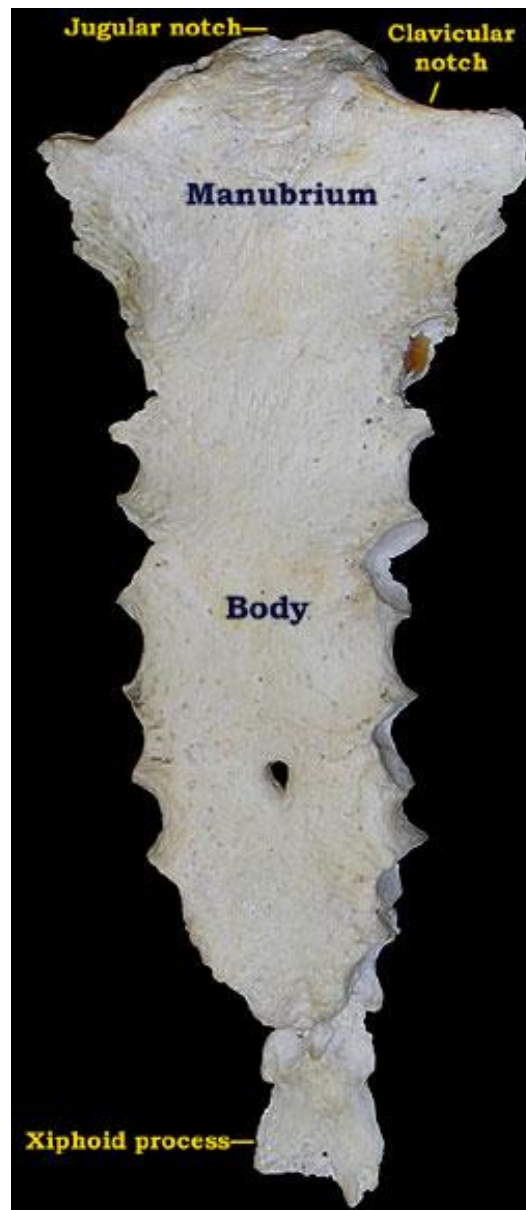


The first seven pairs of ribs are **true ribs** because they attach directly to the sternum via the **costal cartilage**.

The last five pairs of ribs are **false ribs** because they either attach indirectly to the sternum or not at all.

The last two pairs of false ribs are **floating ribs** because they do not attach to the sternum at all.

The Sternum



The **sternum** is the breastbone. It is composed of three bones fused together.

The top bone is the **manubrium**. It has three notches, a **jugular notch** at the top for the jugular vein, and two **clavicular notches**, which articulate with the clavicles.

The middle bone is the **body**.

The bottom bone is the **xiphoid process**. It is usually pointed at the bottom and is used as a point of reference for the Heimlich maneuver.

The Ribs

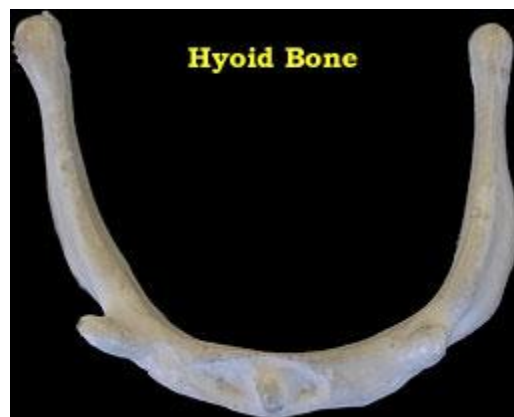


The **anterior end** of a rib is the end that articulates with the costal cartilage.

The rib **head** articulates with the thoracic vertebra of the spinal column.

The **tubercle** is a small bump on the posterior end of the rib that articulates with the vertebra below the vertebra which with the head articulates.

The Hyoid Bone



The **hyoid bone** is found between the chin and the thyroid gland on the anterior neck. This U-shaped bone serves as an attachment site for several muscles that help elevate the larynx during swallowing. It also supports the tongue. The hyoid bone is the only bone in the body that does not articulate with another bone. During an autopsy, a fractured hyoid bone is an indicator of *strangulation*.

The Vertebrae

There are **7 cervical vertebrae**, **12 thoracic vertebrae**, **5 lumbar vertebrae**, **1 sacrum**, and **1 coccyx**.

Cervical vertebrae

The **atlas**, the first cervical vertebra (C_1), articulates with the occipital condyles of the skull. It is the only vertebra *without a body*. It has a very large vertebral foramen through which the dens of the axis protrudes at the anterior end. It is also the only vertebra that does not have a *spinous process*. Instead, it has a **posterior tubercle**.

The **axis**, the second cervical vertebra (C_2), articulates with the atlas. It has a prominent, tooth-like process, called the **dens**, that *projects superiorly from the body* of the vertebra and fits into the anterior portion of the vertebral foramen of the atlas.

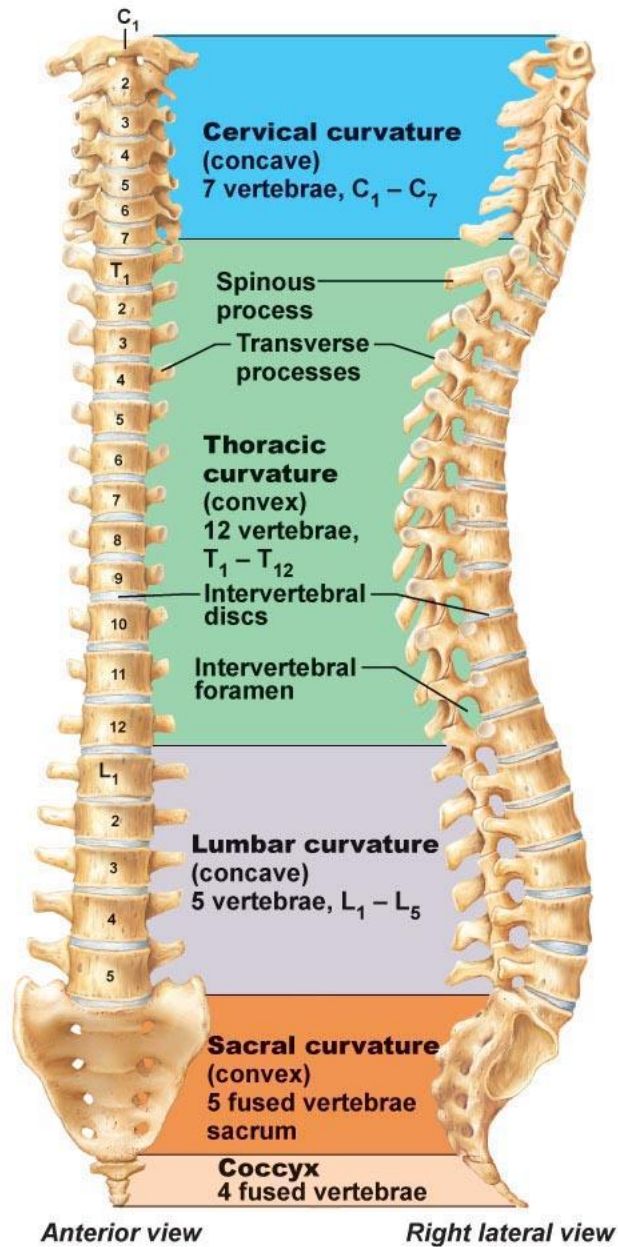
All 7 **cervical vertebrae** have a **vertebral foramen** that is larger than the **body** (with the exception of the atlas, which has no body). The **spinous process** of the cervical vertebrae (except the atlas) is *short and bifid (forked)*. Another distinctive feature of cervical vertebrae are the **transverse foramina**, two additional openings in the **transverse processes**.

The **thoracic vertebrae** are a bit larger than the cervical vertebrae (to support more body weight). The **vertebral foramen** is round, and the **body** is usually heart-shaped. The thoracic vertebrae become larger as they get closer to the lumbar vertebrae. They have a distinctively long, slender (triangular) **spinous process**. The **transverse processes** are long, thick, and strong. When viewed from the side, thoracic vertebrae resemble an elephant.

The **lumbar vertebrae** have large, thick bodies (to support much body weight). The large **body** has a wide oval shape. The **vertebral foramen** is small and somewhat triangular. The **spinous process** is thick, broad, flattened, and rounded at the tip. When viewed from the side, the lumbar vertebrae resemble a moose.

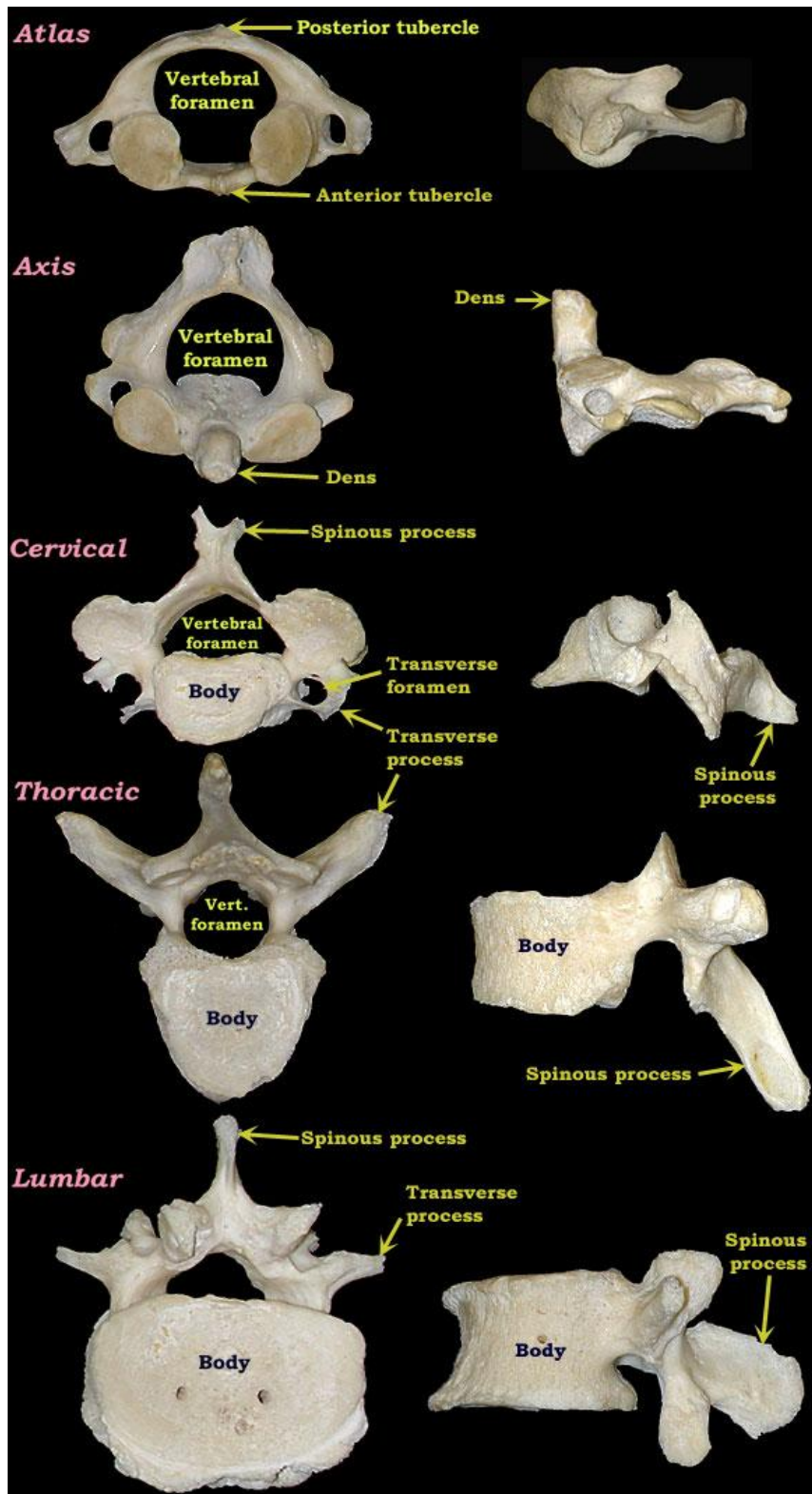
The **sacrum** is a large, triangular bone that articulates with the fifth lumbar vertebra. It consists of five fused vertebrae. It is concave on the anterior side, to give increased capacity to the pelvic cavity. There are four pairs of **sacral foramina**, for the passage of spinal nerves. The dorsal (posterior) side of the sacrum is convex. At the top of the dorsal side is the **superior sacral canal**, which forms a passageway for the spinal cord. At the inferior end is the **sacral hiatus**, which is an opening for the exit of inferior spinal nerves.

The **coccyx** consists of four (or five) fused vertebrae below the sacrum. They diminish in size from the first to the fourth. The coccyx is also known as the “*tailbone*”.



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The Vertebrae



The Sacrum and Coccyx

