

BIO 201 – Skeletal System Anatomy Lab

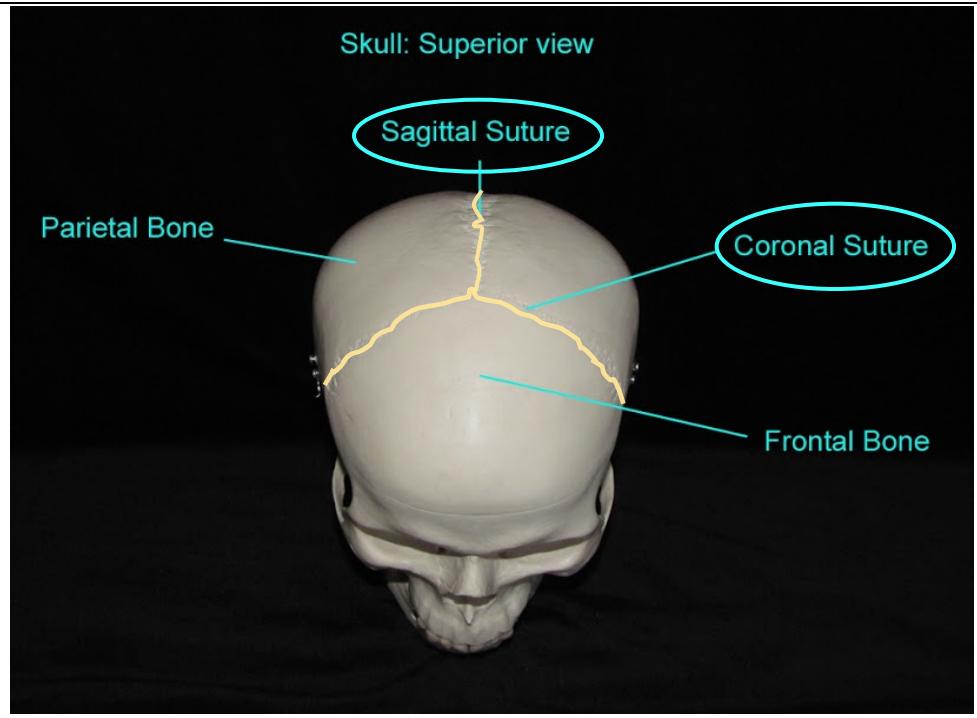
Axial Skeleton

Skull – Sutures

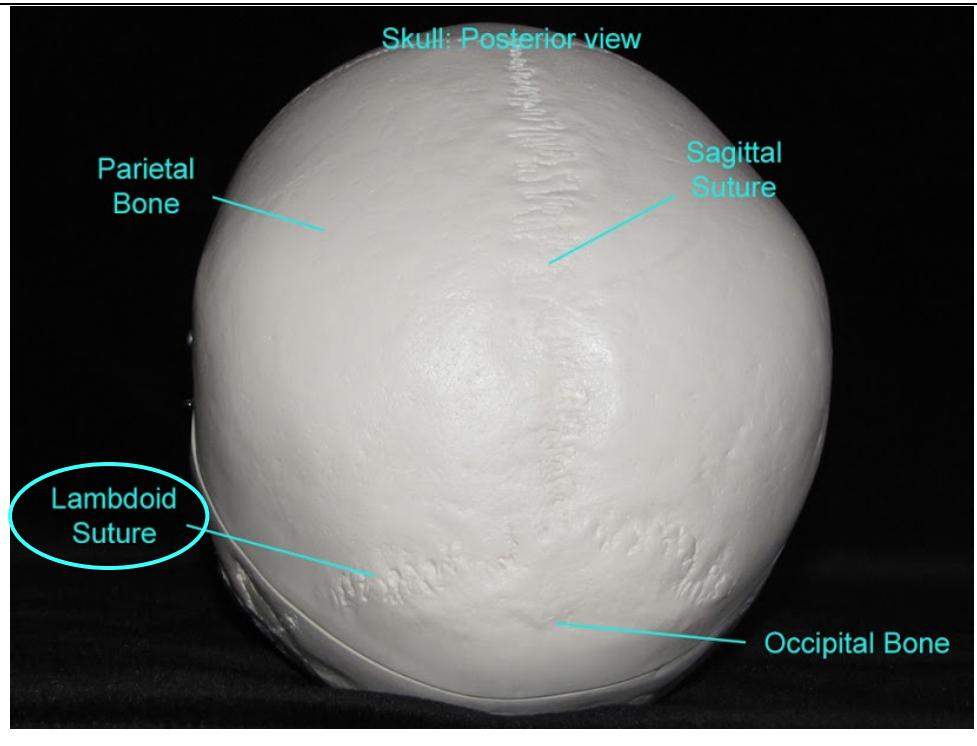
1. Coronal suture

2. Sagittal suture

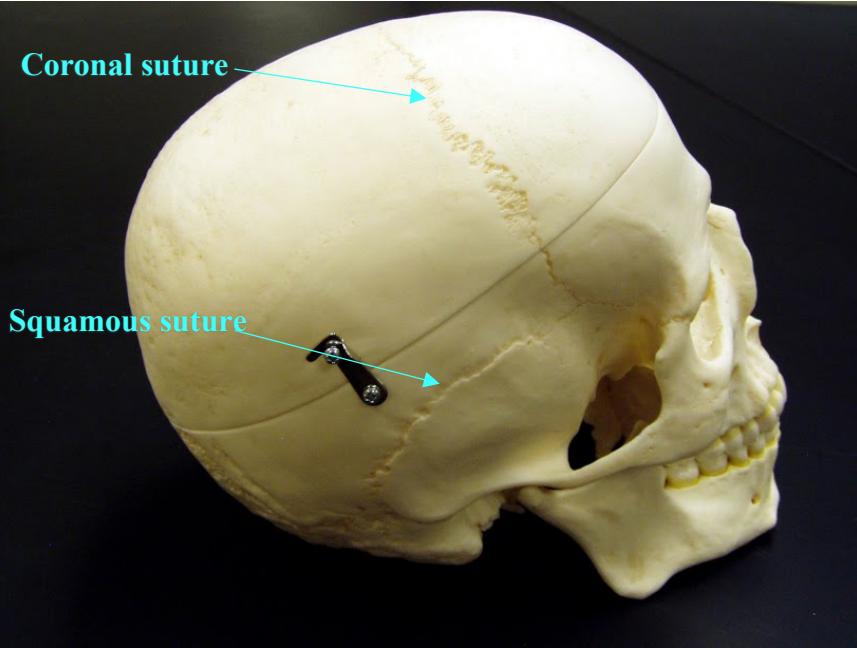
** I outlined the sutures in yellow in this image, as they were difficult to see)



3. Lambdoid suture (looks like the Greek lambda Λ)
**Sagittal suture is shown here again.

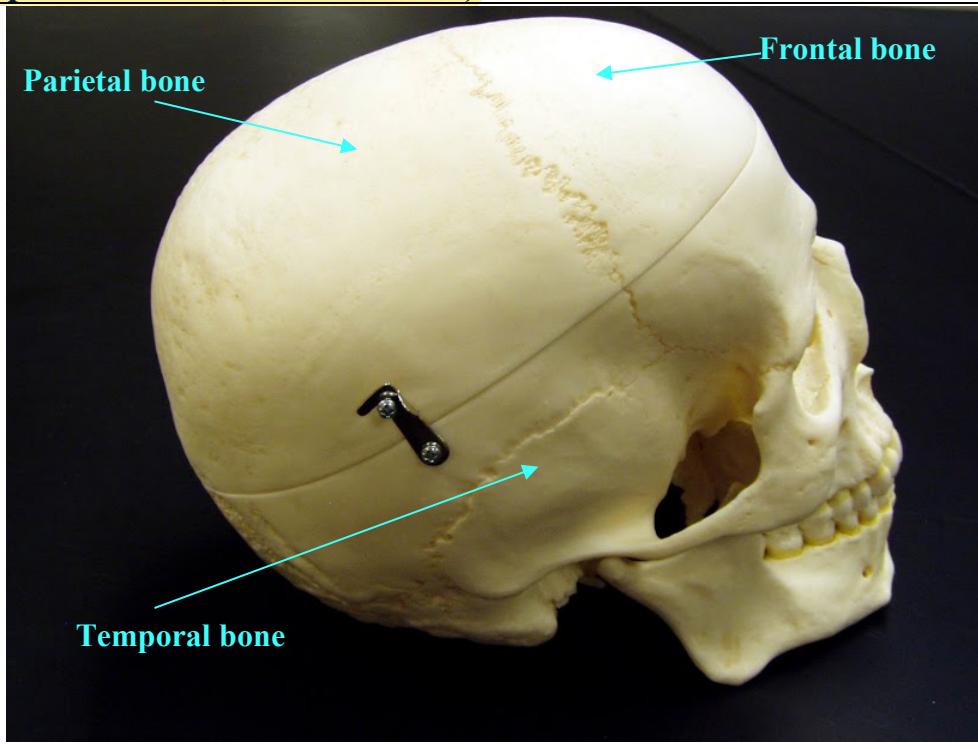


4. Squamous suture
**Coronal suture is shown here again.

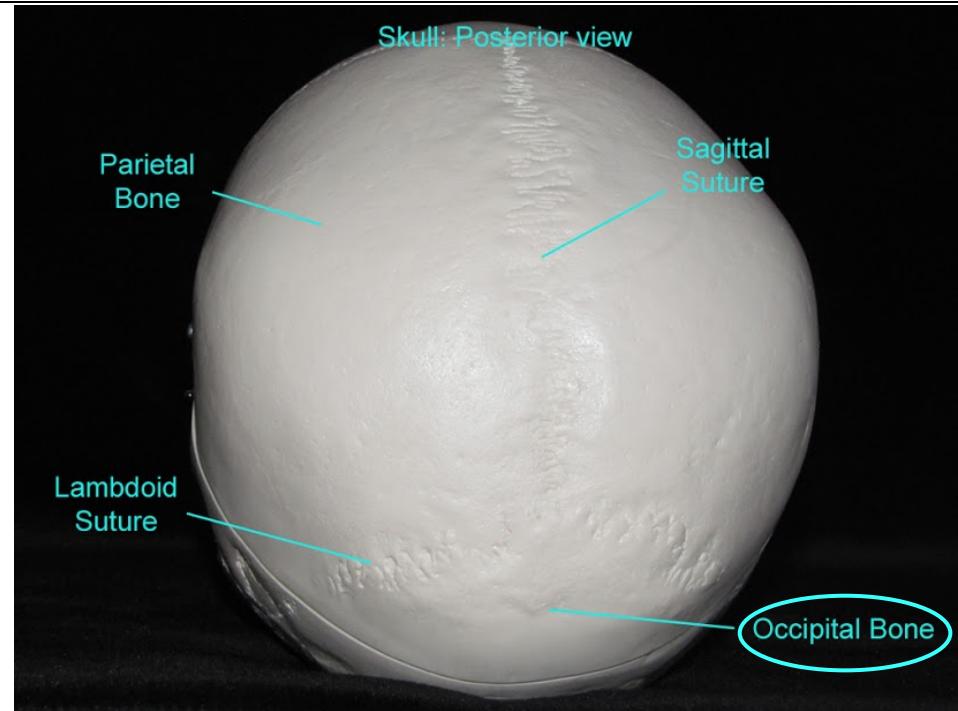


Skull – 8 cranial bones (Frontal bone, 2 Parietal bones, 2 Temporal bones, Occipital bone, Sphenoid bone, Ethmoid bone)

1. Frontal bone
2. Parietal bone
3. Temporal bone



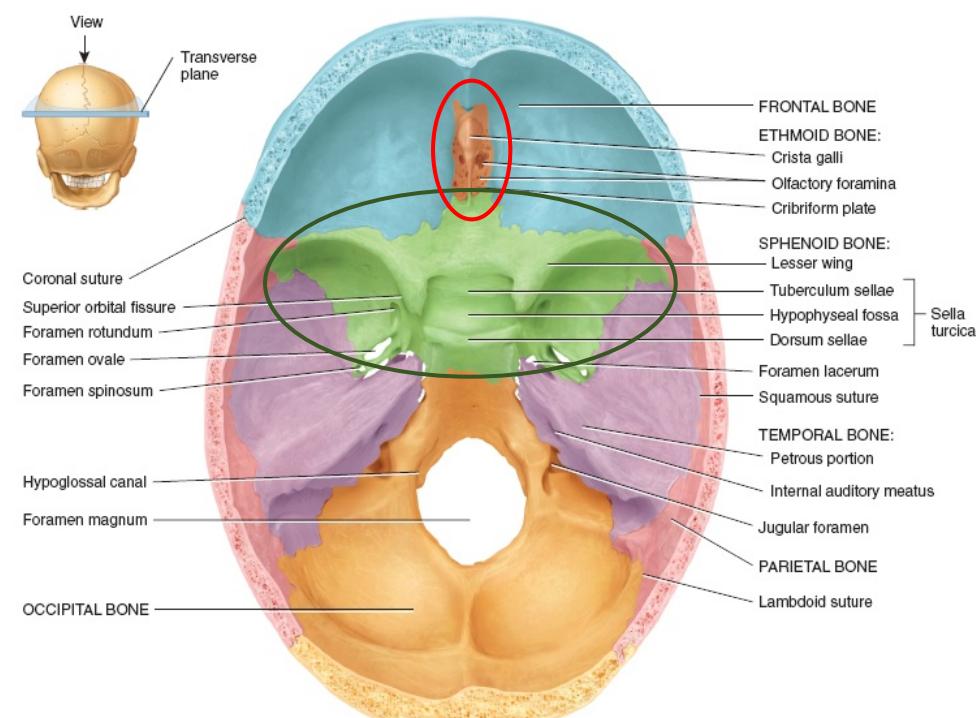
4. Occipital bone
****both parietal bones are shown here as well.**



5. Sphenoid bone (green)
6. Ethmoid bone (red)

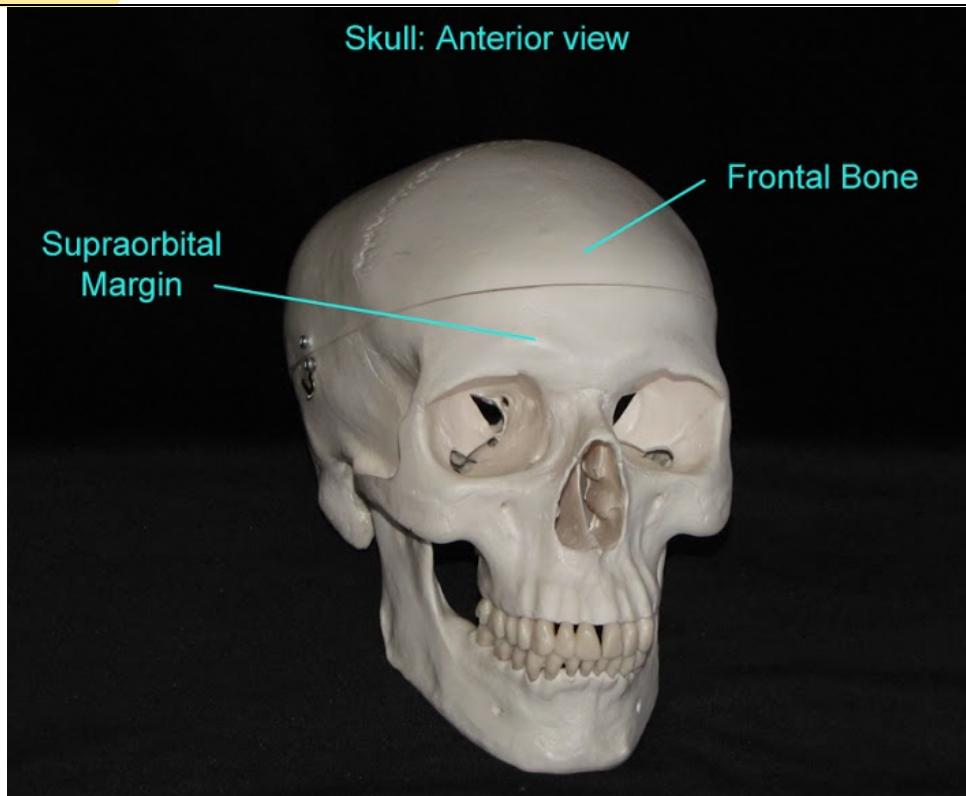
Image source:
Tortora,
Derrickson:

Principles of
Anatomy and
Physiology, 13th
Edition



Skull – Frontal Bone

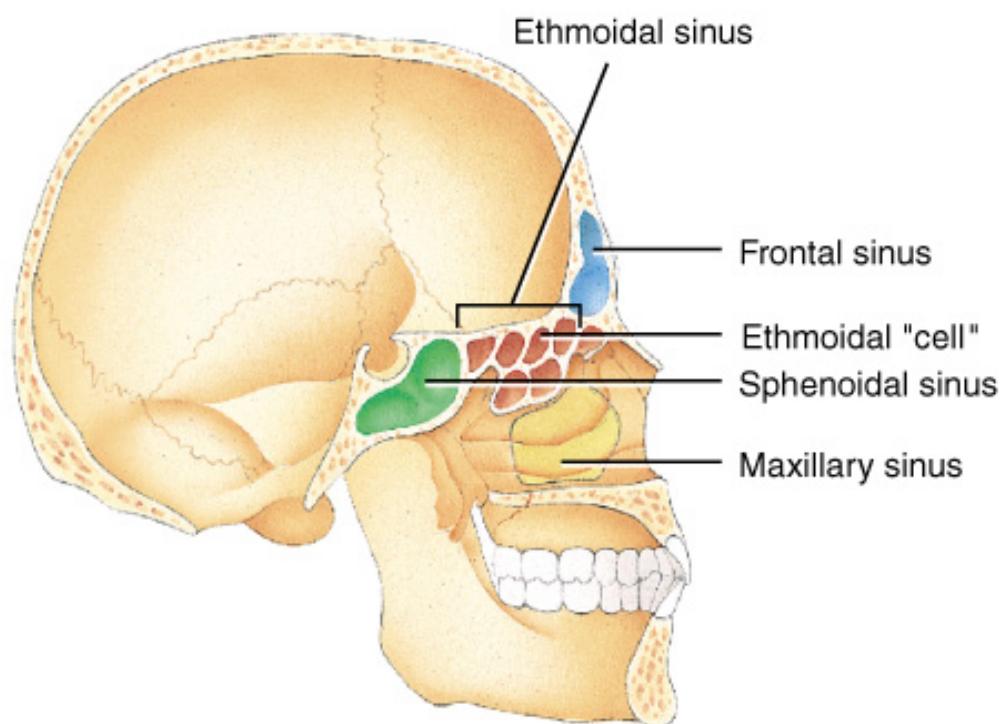
1.
Supraorbital
margin



2. Frontal
sinus

Image
source:
Tortora,
Derrickson:

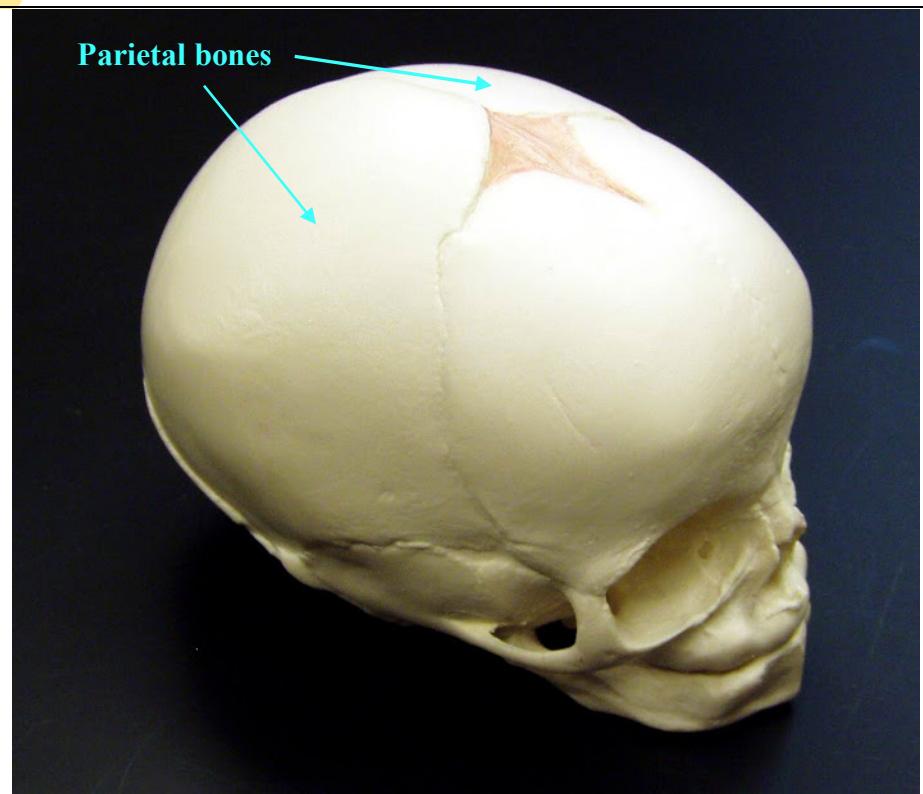
Principles of
Anatomy and
Physiology,
11th Edition



Skull – Parietal bone

1. Parietal bone
(infant skull)

Parietal bones



Skull – Temporal bone

1. External
auditory meatus
2. Mastoid
process
3. Styloid process

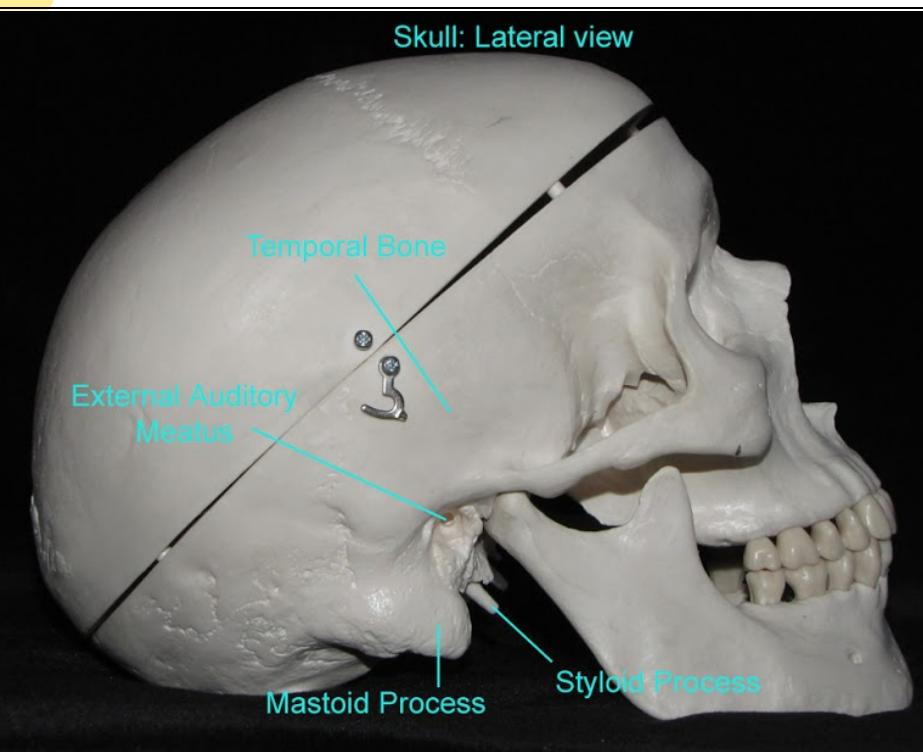
Skull: Lateral view

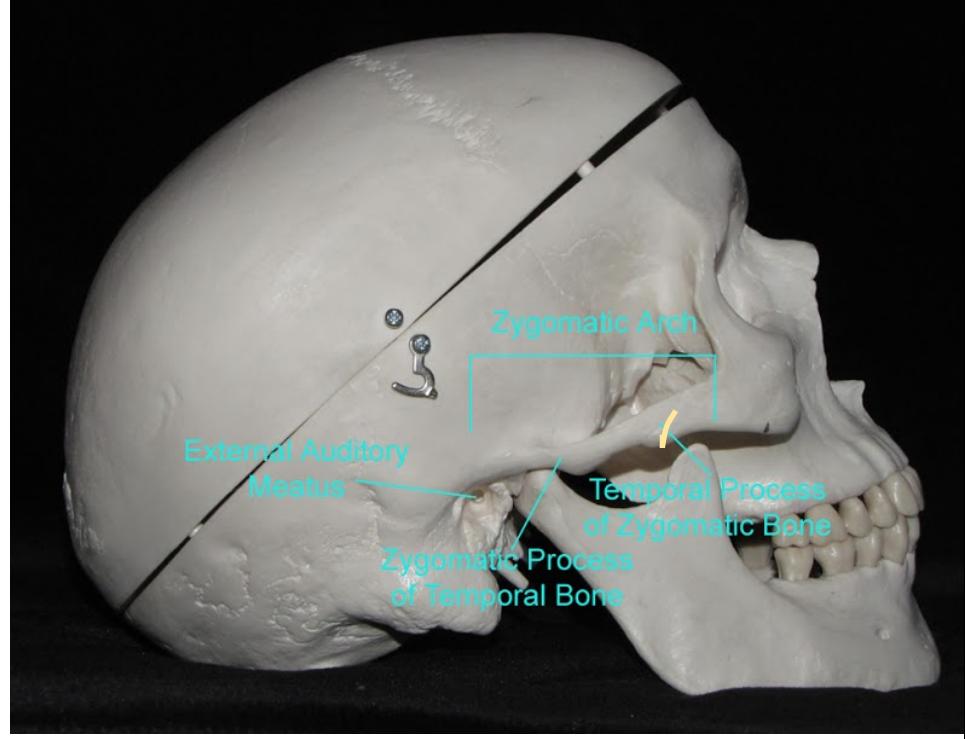
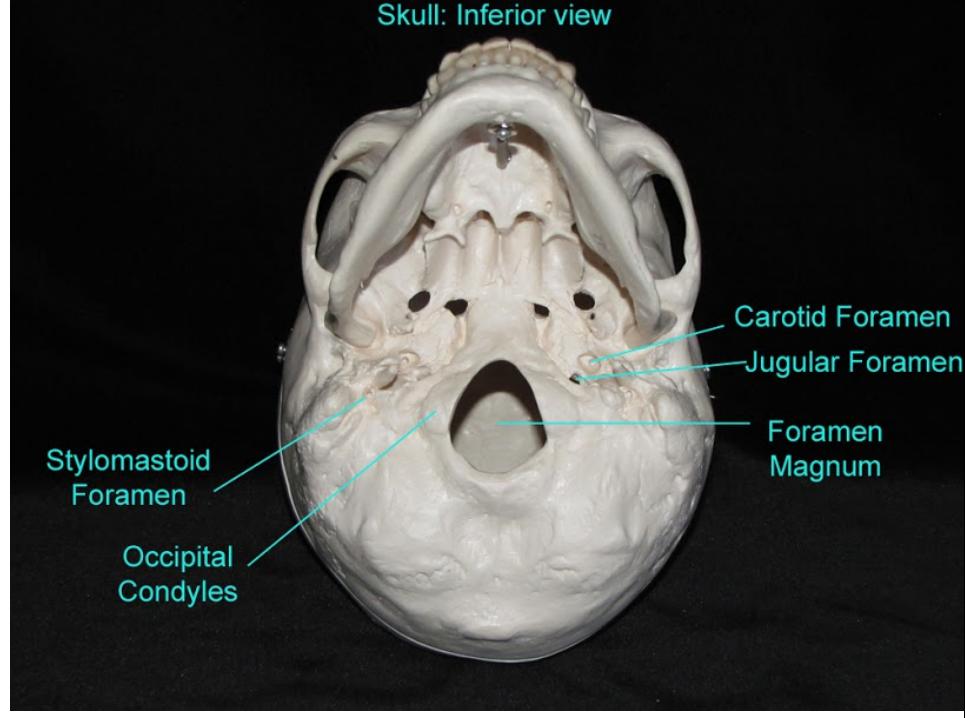
Temporal Bone

External Auditory
Meatus

Mastoid Process

Styloid Process

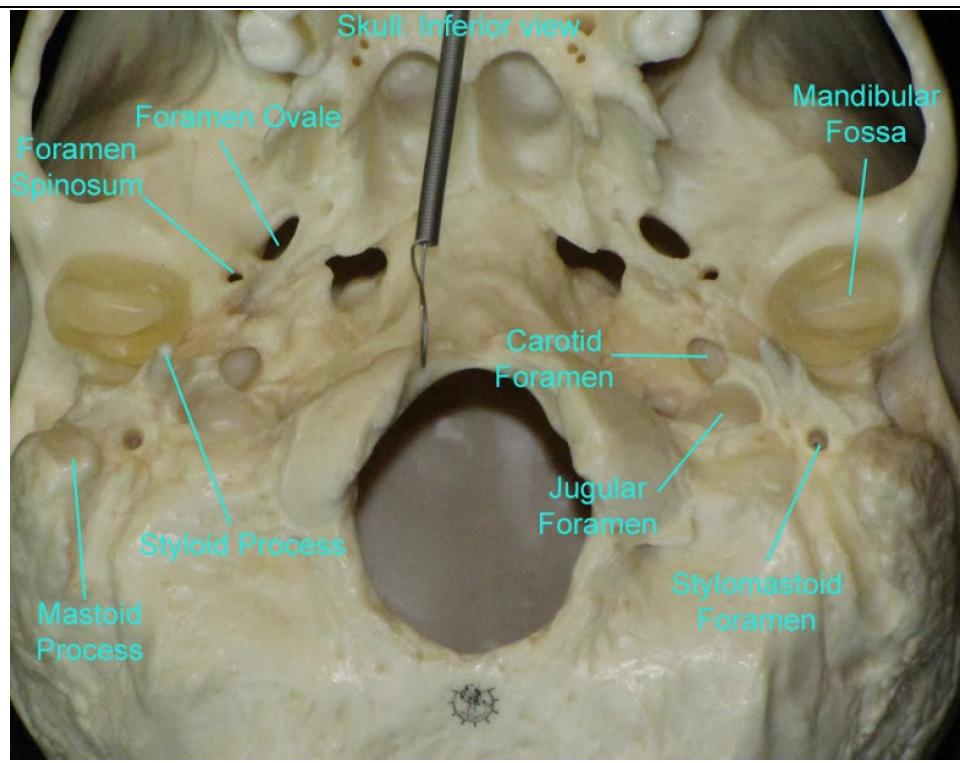


<p>4. Zygomatic process of the temporal bone, part of the zygomatic arch (the yellow line depicts the Zygomatico-temporal suture where the zygomatic process of the temporal bone articulates with the temporal process of the zygomatic bone)</p>	 <p>This image shows the anterior (front) view of a human skull. A black line runs from the external auditory meatus (ear opening) upwards and laterally to form the zygomatic arch. A yellow line extends from the temporal process of the zygomatic bone downwards to meet the zygomatic process of the temporal bone at the zygomatico-temporal suture. Labels include: External Auditory Meatus, Zygomatic Arch, Temporal Process of Zygomatic Bone, Zygomatic Process of Temporal Bone.</p>
<p>4. Stylomastoid foramen (for facial nerve) 5. Carotid foramen (for internal carotid artery) 6. Jugular foramen (for internal jugular vein, glossopharyngeal nerve, vagus nerve, and accessory nerve)</p>	 <p>This image shows the inferior (bottom) view of a human skull. Labels indicate: Stylomastoid Foramen (labeled twice), Occipital Condyles, Carotid Foramen, Jugular Foramen, and Foramen Magnum. The title "Skull: Inferior view" is centered above the image.</p>

7. Mandibular fossa

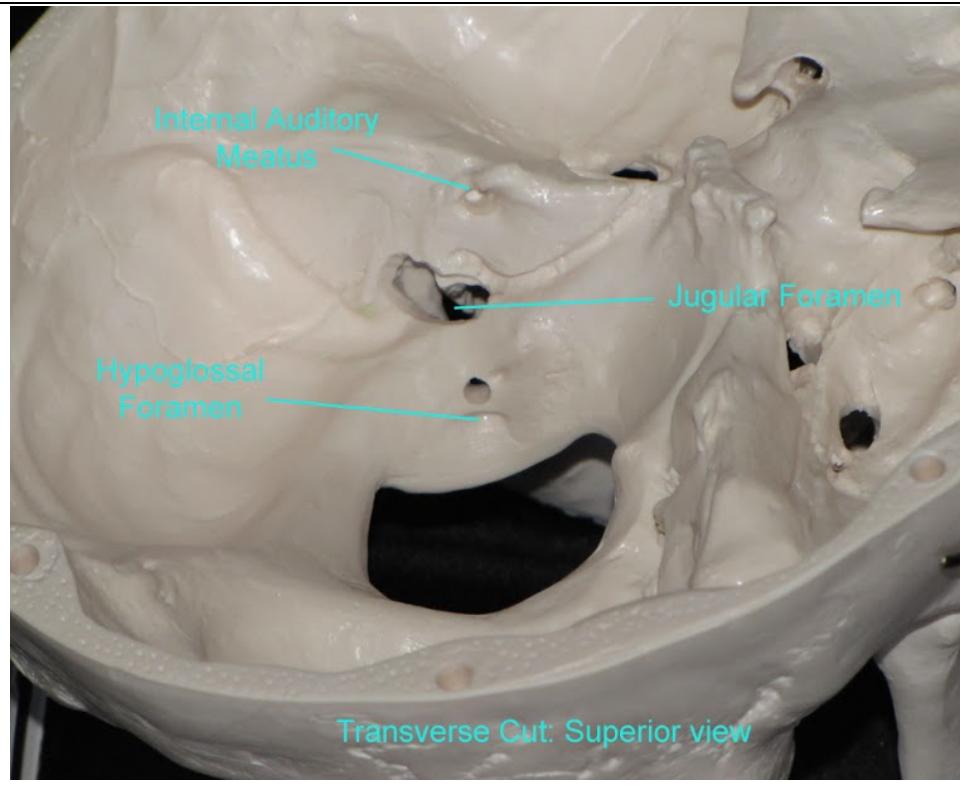
*Mastoid process, styloid process, stylomastoid foramen, carotid foramen, and jugular foramen may all be seen here!

** I will post a video of just the foramen to help you better identify them**



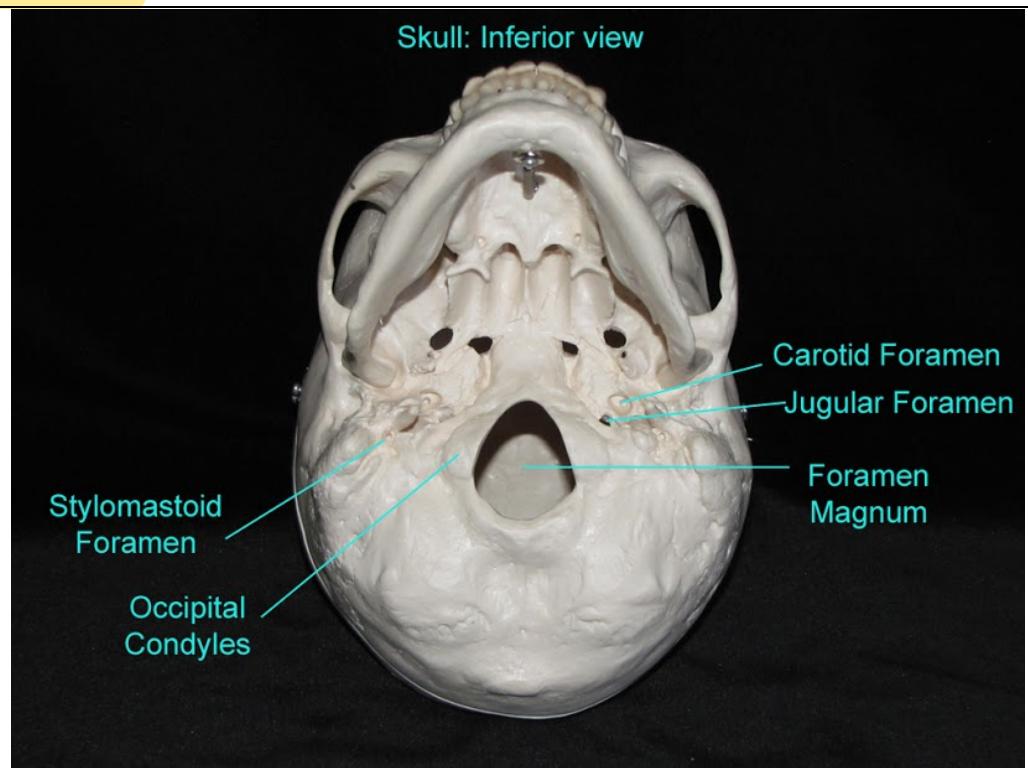
8. Internal auditory meatus (for vestibulocochlear nerve)

*Jugular foramen may all be seen here!

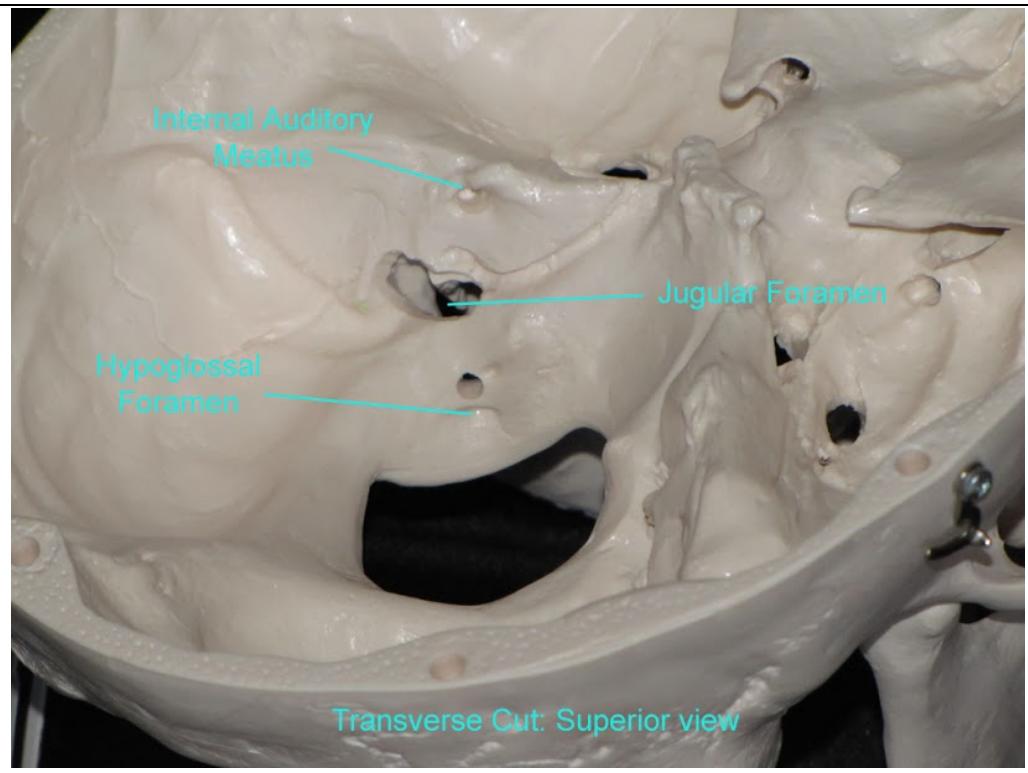


Skull – Occipital bone

1. Foramen magnum
2. Occipital condyle

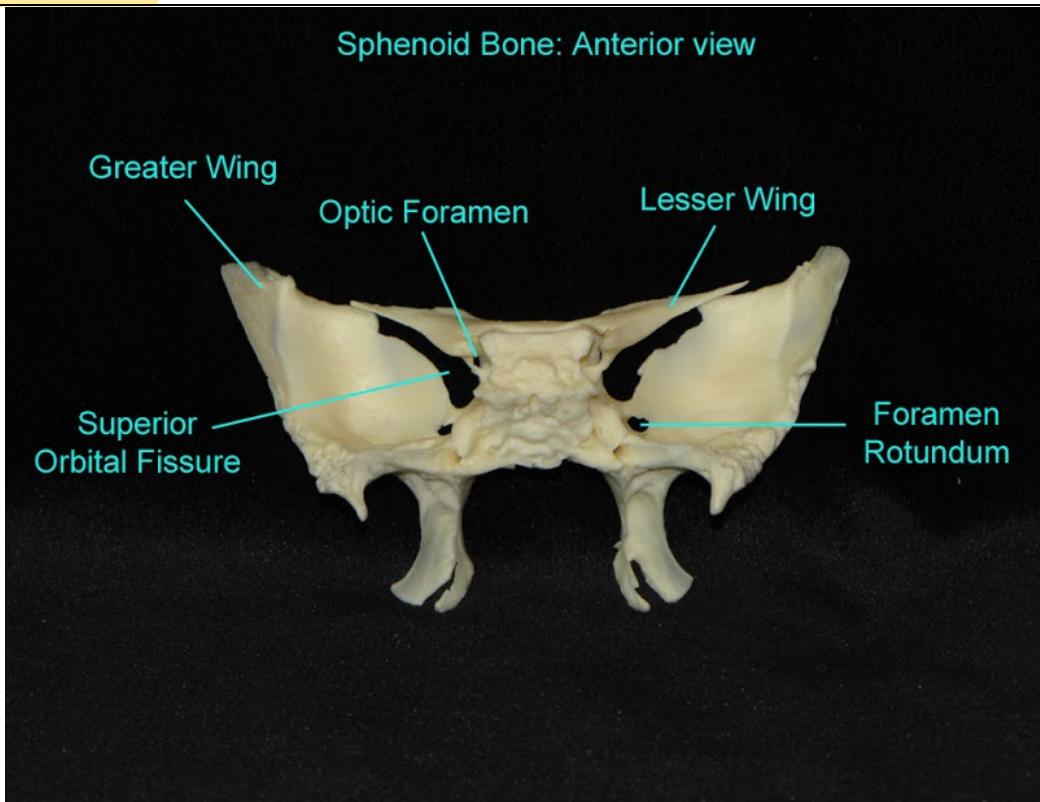


3. Hypoglossal foramen or canal (for hypoglossal nerve) – this view shows the foramina left of the foramen magnum.



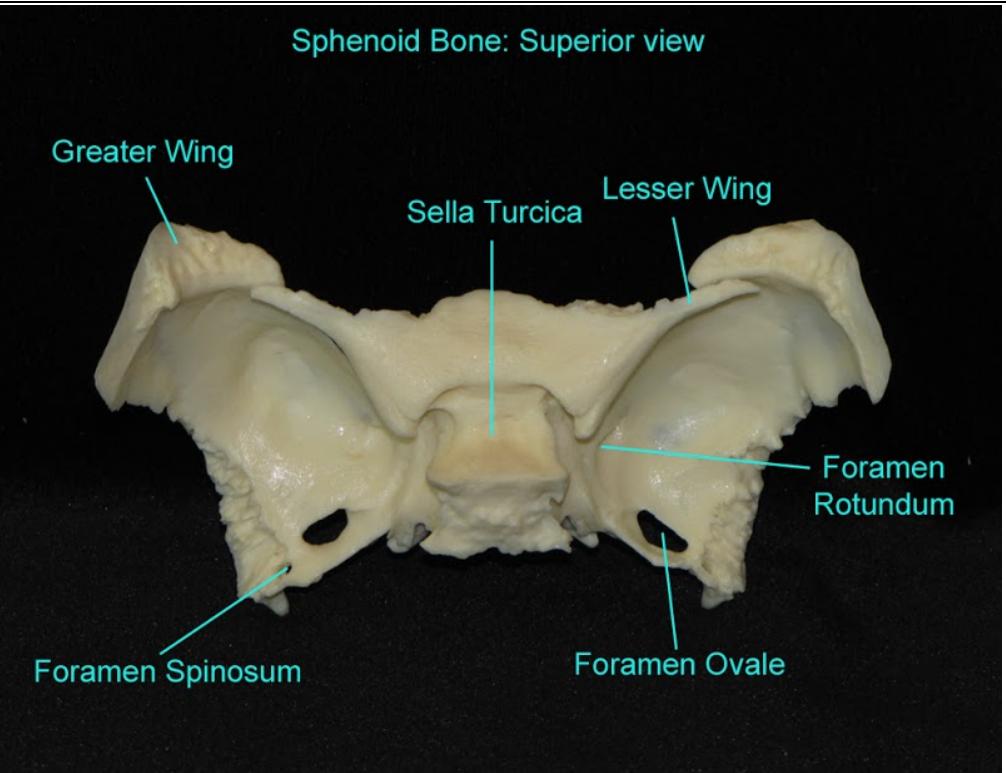
Skull – Sphenoid bone

1. Greater wing
2. Lesser wing
3. Optic foramen (for optic nerve)
4. Superior orbital fissure (for oculomotor, trochlear, ophthalmic branch of trigeminal, and abducens nerves)
5. Foramen rotundum (for maxillary branch of trigeminal nerve).

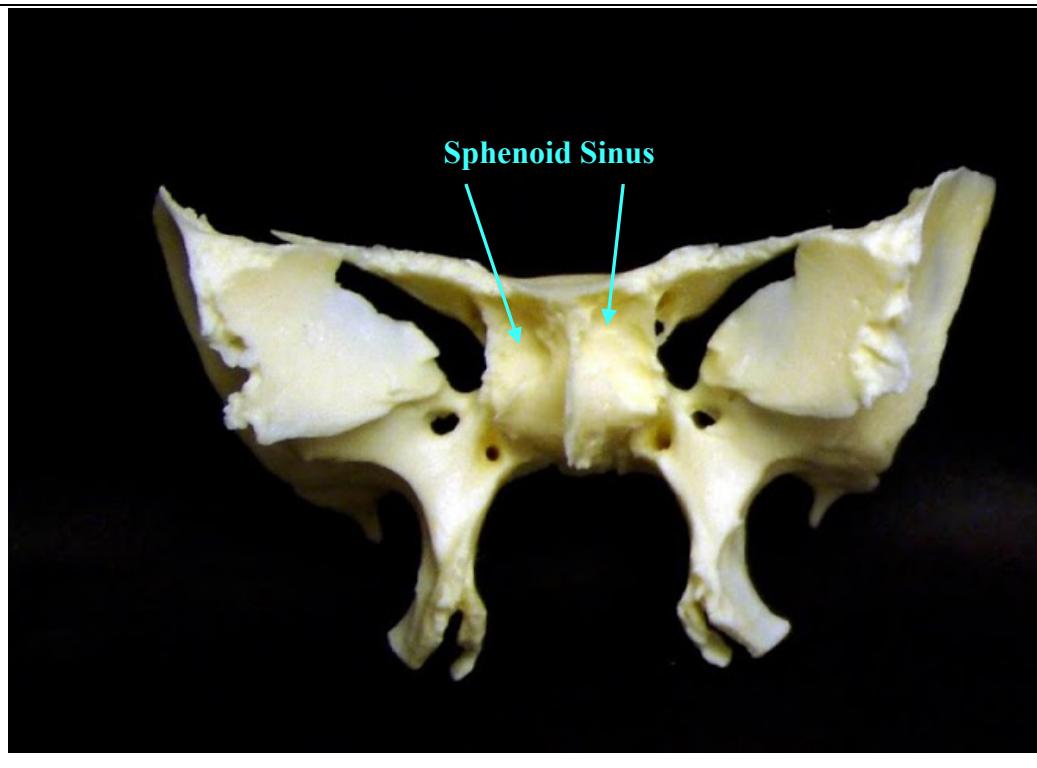


6. Sella turcica
(contains the pituitary gland)

7. Foramen ovale (for mandibular branch of trigeminal nerve)



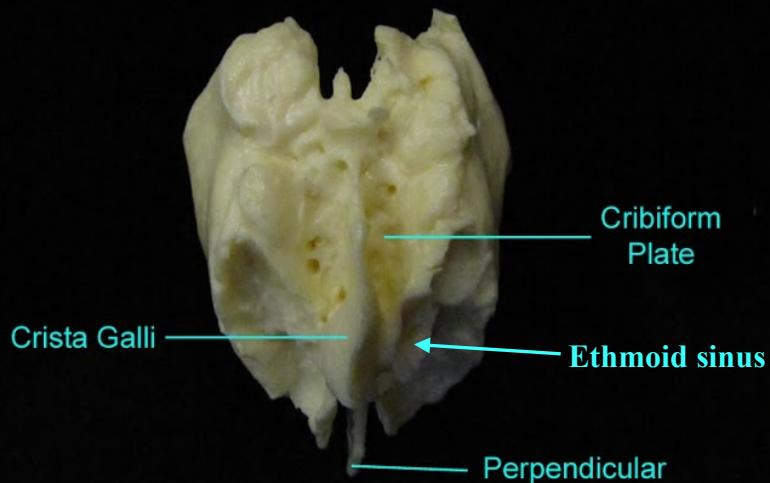
8.
Sphenoid sinus (the space inside)



Skull – Ethmoid bone

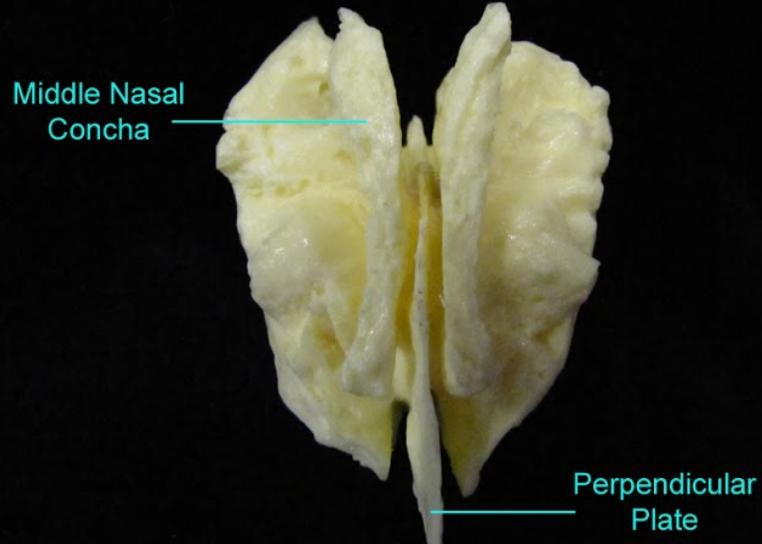
1. Crista galli (point of attachment for the falx cerebri = membrane that separates the 2 sides of the brain)
2. Cribiform Plate (for olfactory nerves)
3. Perpendicular plate
4. Ethmoid sinus (air filled cells within)

Ethmoid Bone: Superior view



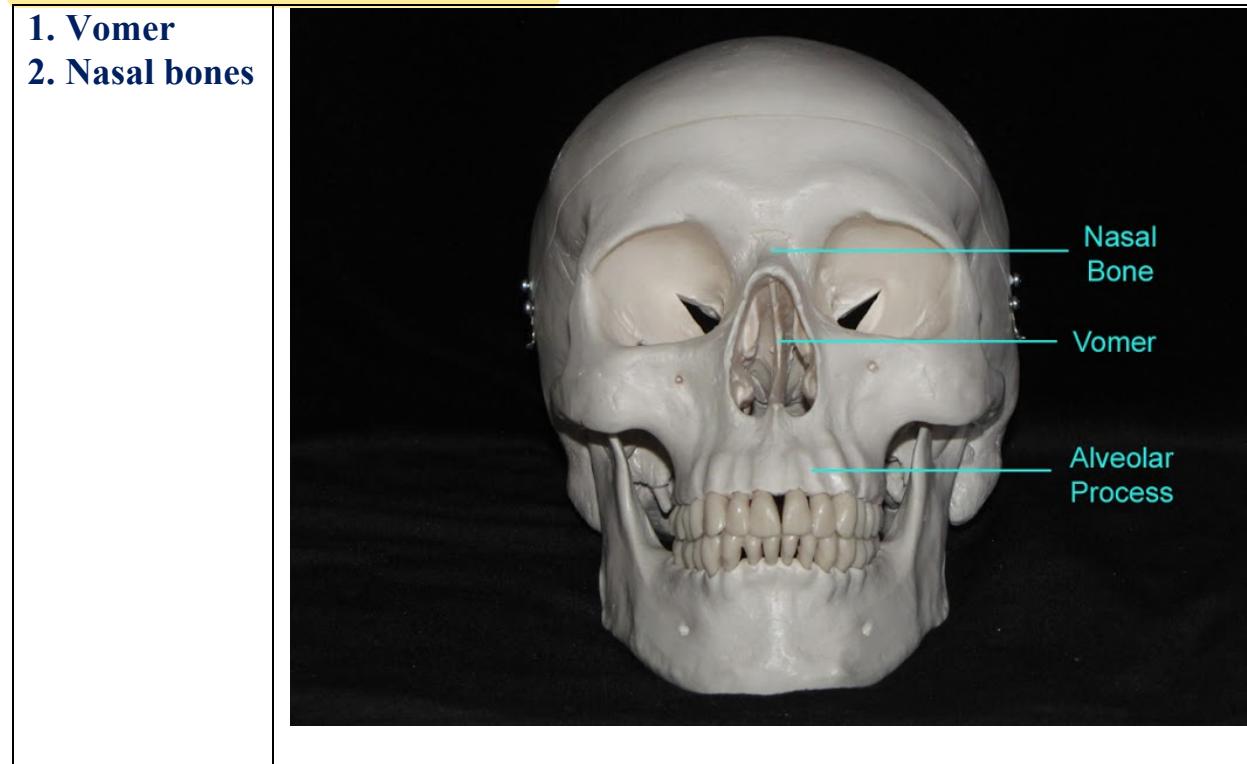
4. Middle nasal concha

Ethmoid Bone: Inferior view

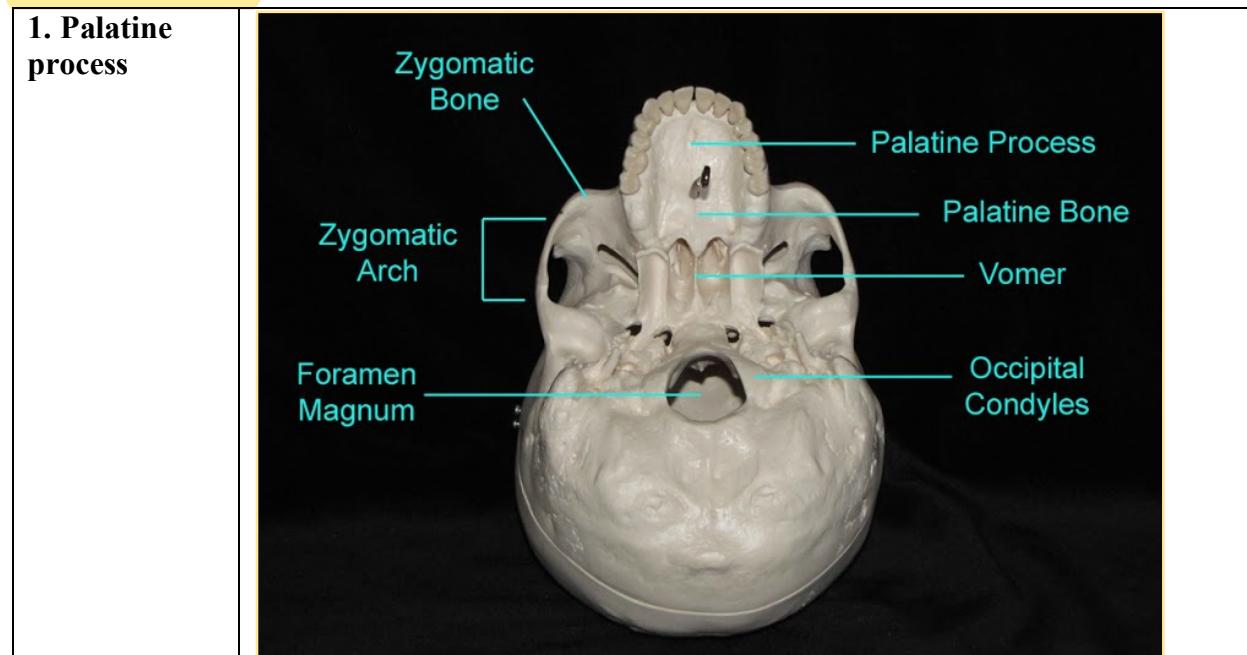


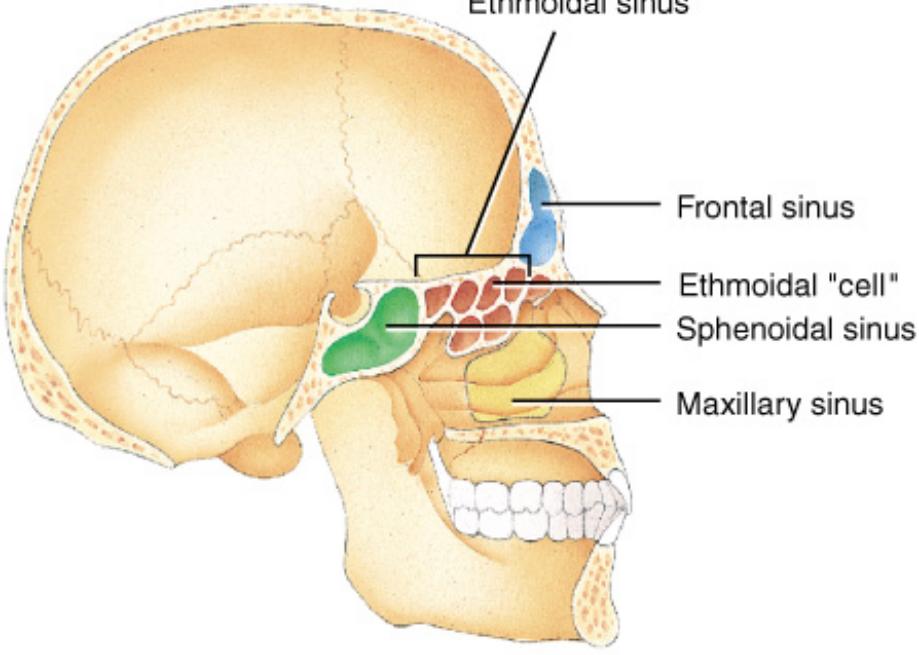
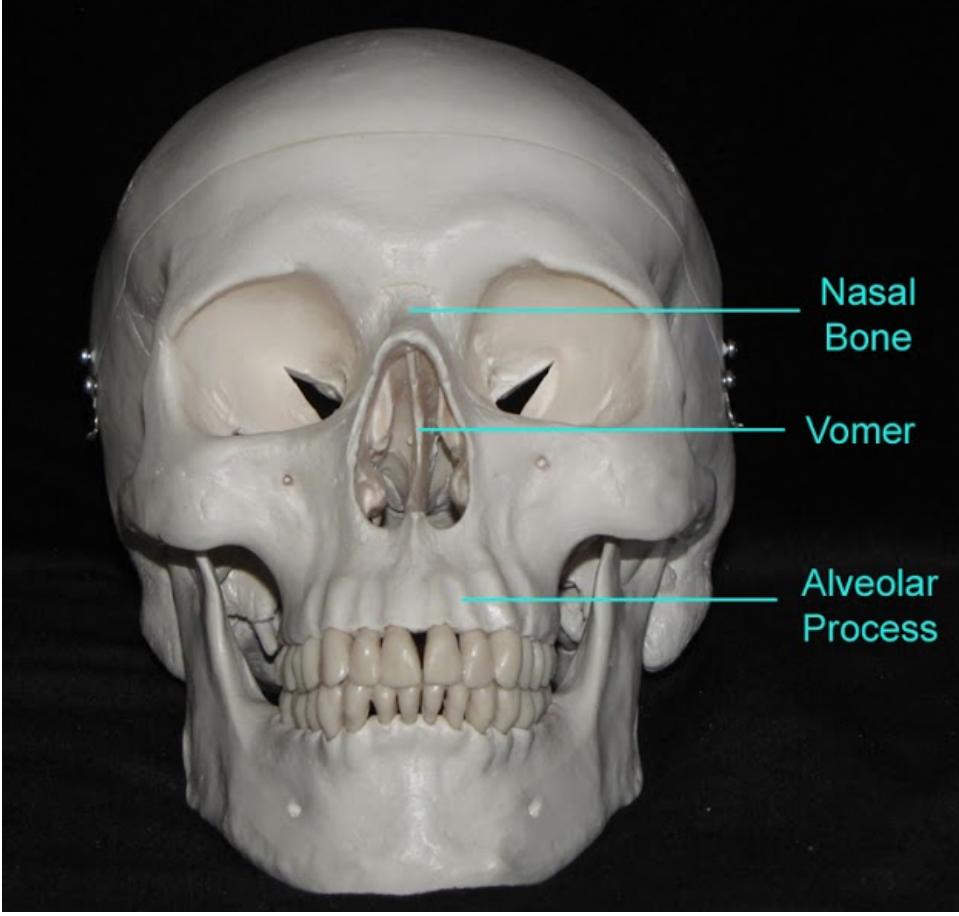
Skull – the 14 Facial bones include 2 nasal bones, 2 maxillae, 2 zygomatic bones, the mandible, 2 lacrimal bones, 2 palatine bones, 2 inferior nasal conchae, and the vomer.

Skull – Vomer and the Nasal bone



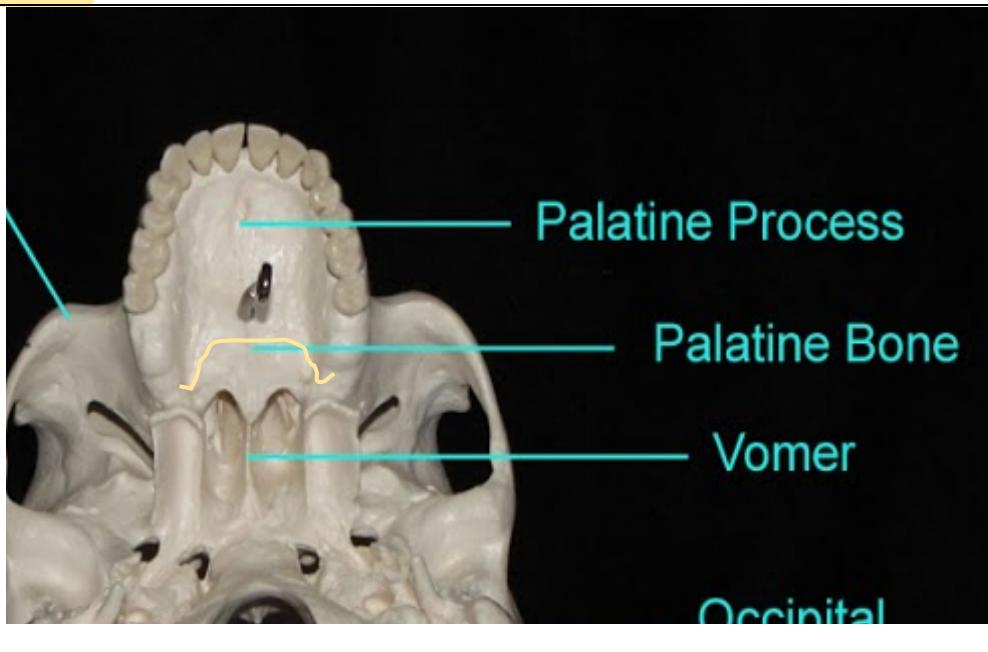
Skull – Maxilla



<p>2. Maxillary Sinus</p> <p>Image source: Tortora, Derrickson: Principles of Anatomy and Physiology, 11th Edition</p>	 <p>Ethmoidal sinus</p> <p>Frontal sinus</p> <p>Ethmoidal "cell"</p> <p>Sphenoidal sinus</p> <p>Maxillary sinus</p>
<p>3. Alveolar process</p>	 <p>Nasal Bone</p> <p>Vomer</p> <p>Alveolar Process</p>

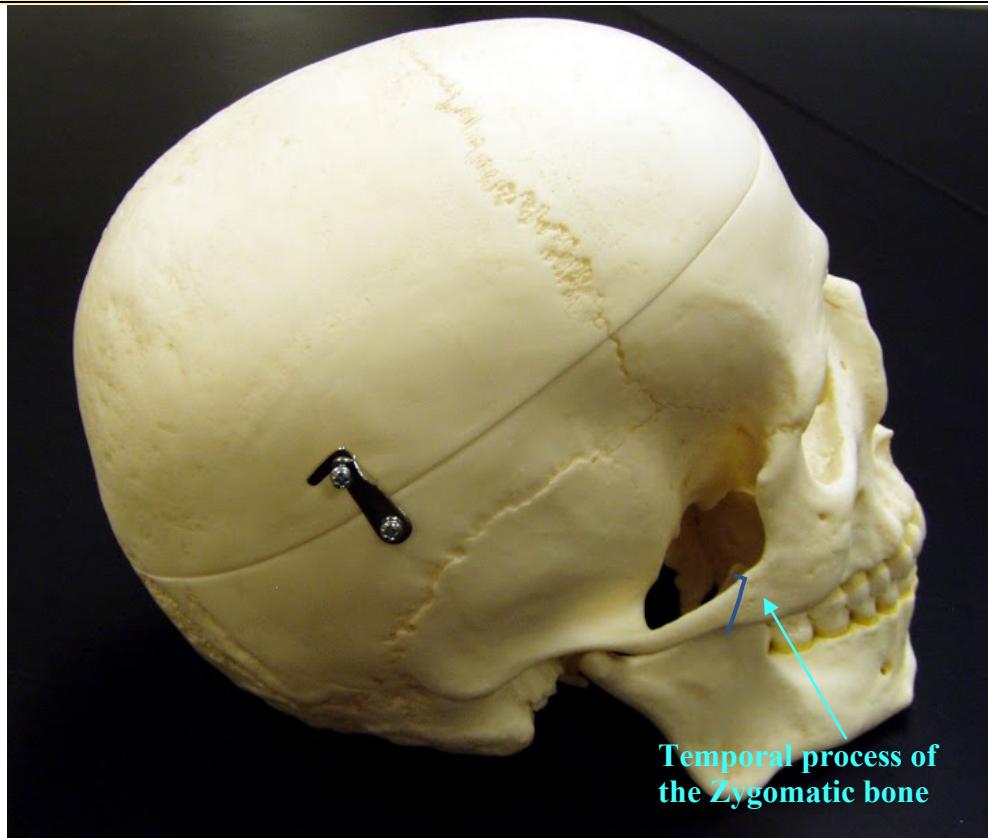
Skull – Palatine bone

Palatine Bone (the rough outline in yellow is to help you differentiate the palatine bone from the maxilla)



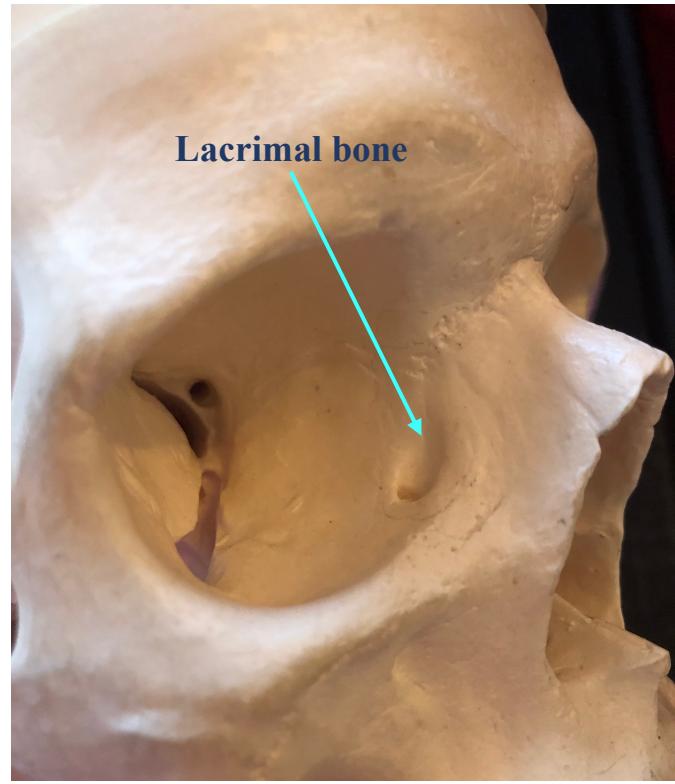
Skull – Zygomatic bone

1. Temporal process of the Zygomatic bone (part of the zygomatic arch)



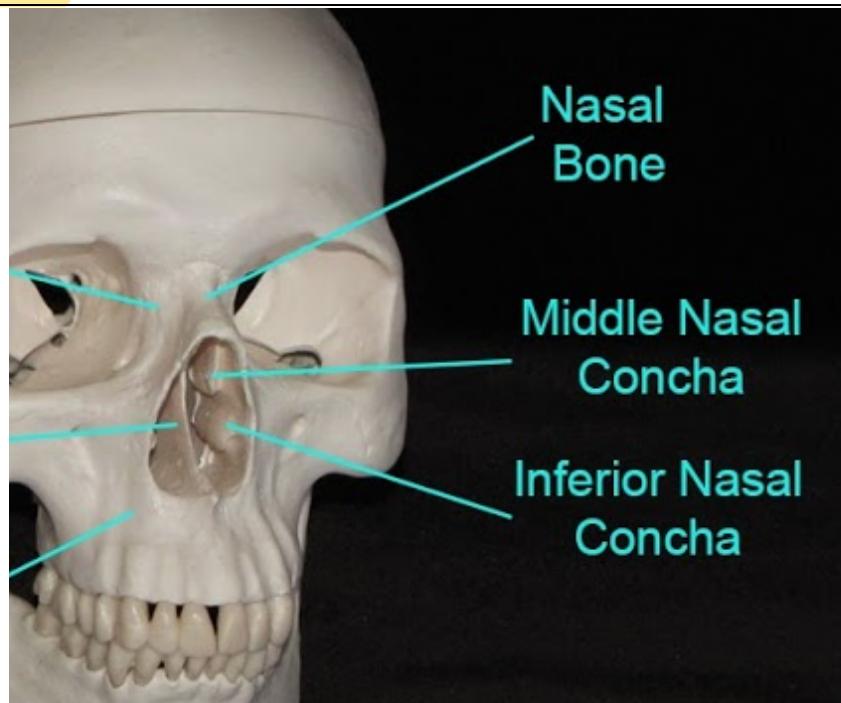
Skull – Lacrimal bone

1. Lacrimal bone – the lacrimal fossa is a nice landmark for the lacrimal bone.

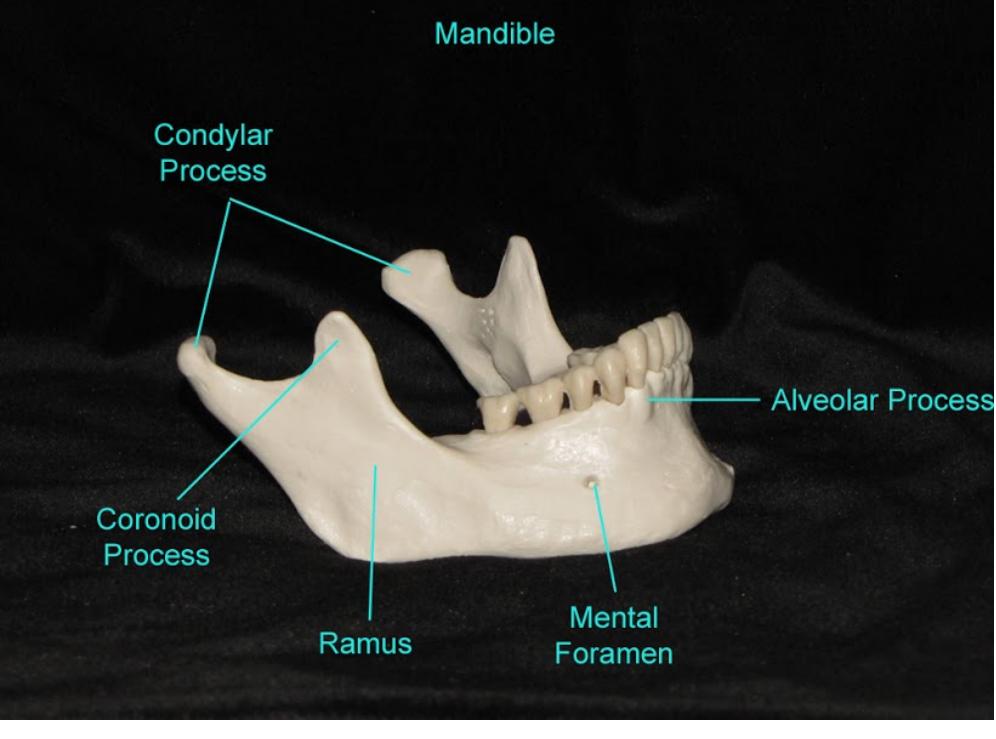
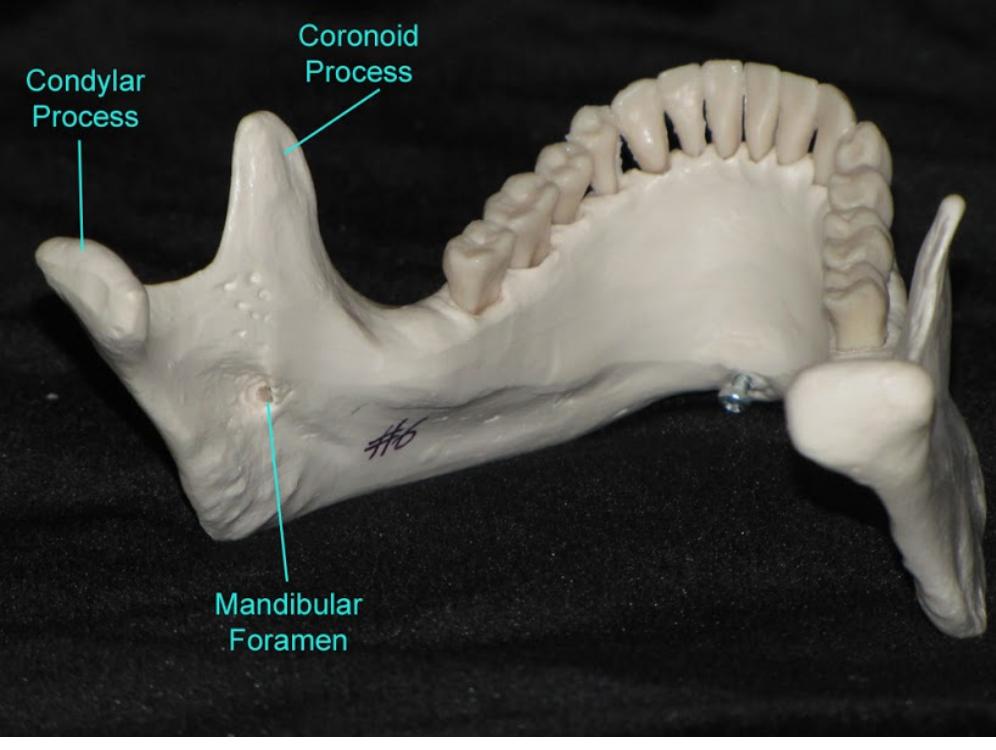


Skull – Inferior nasal concha

1. Inferior nasal concha



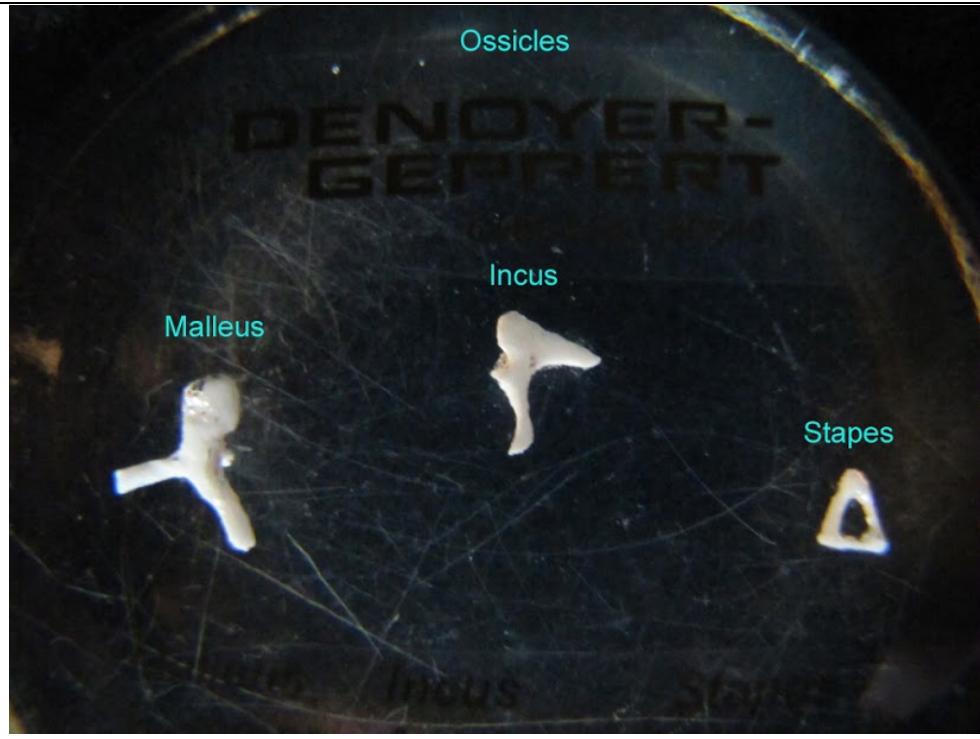
Skull – Mandible

<p>1. Alveolar process (alveolar margins) 2. Ramus 3. Condylar process (= mandibular condyle) 4. Coronoid process (coronoid = beak-like) 5. Mental foramen (for branch of alveolar nerve to lower lip and chin) – important dental landmark.</p>	 <p>Mandible</p> <p>Condylar Process</p> <p>Coronoid Process</p> <p>Ramus</p> <p>Alveolar Process</p> <p>Mental Foramen</p>
<p>6. Mandibular foramen (for inferior alveolar nerve, a branch of the mandibular nerve, and artery to teeth) – important dental landmark.</p> <p>*Condylar process and the coronoid process may also be seen here.</p>	 <p>Condylar Process</p> <p>Coronoid Process</p> <p>Mandibular Foramen</p>

Skull – Ossicles

Ossicles – located in the middle ear cavity within the temporal bone.

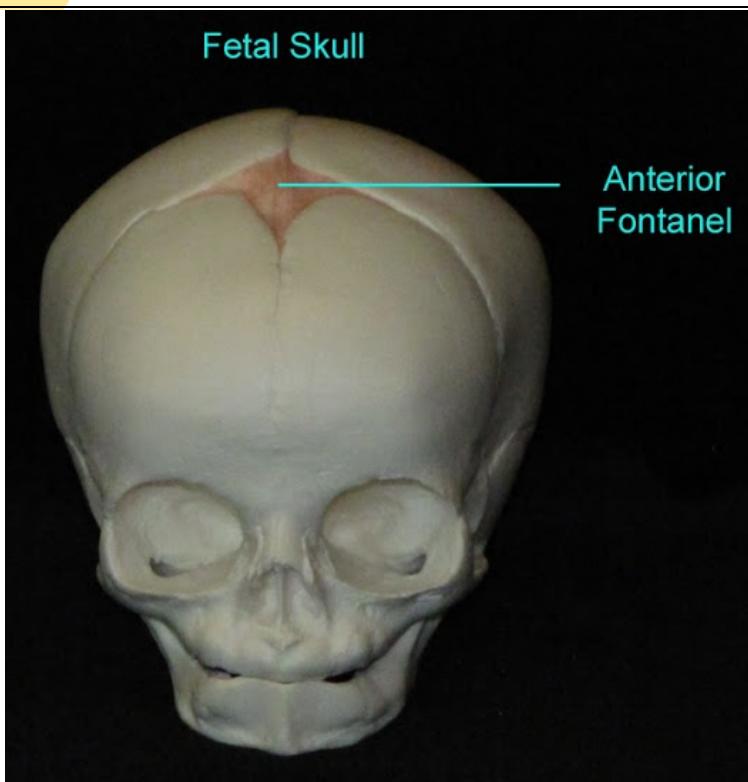
1. Malleus
2. Incus
3. Stapes



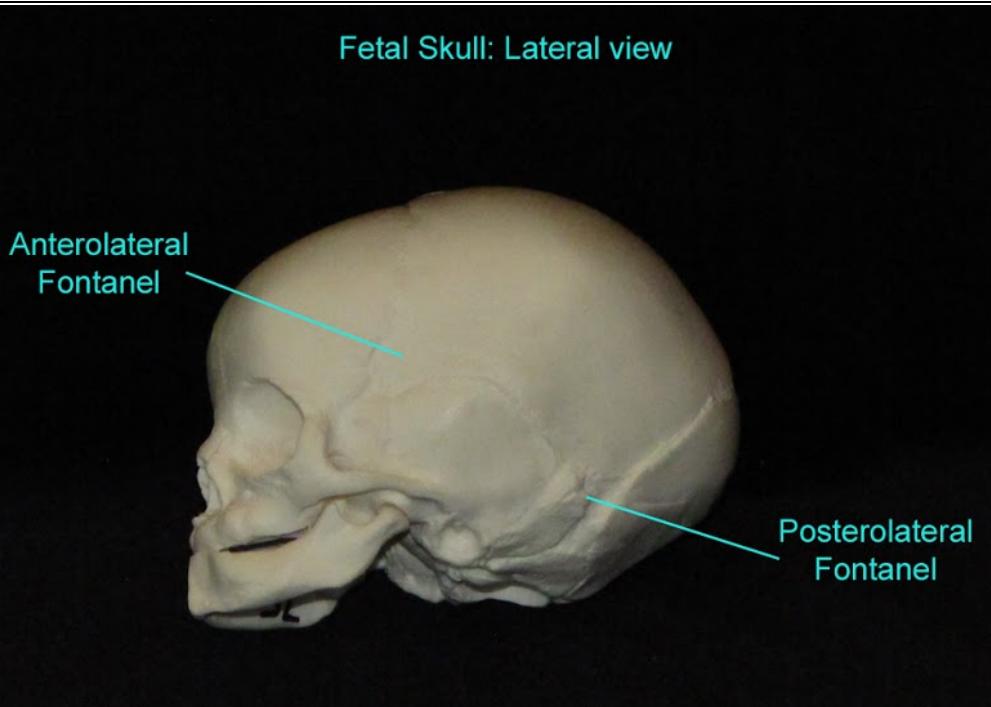
Skull – Fetal skull

1. Anterior (frontal) fontanel

*Frontal bones and parietal bones may be seen here



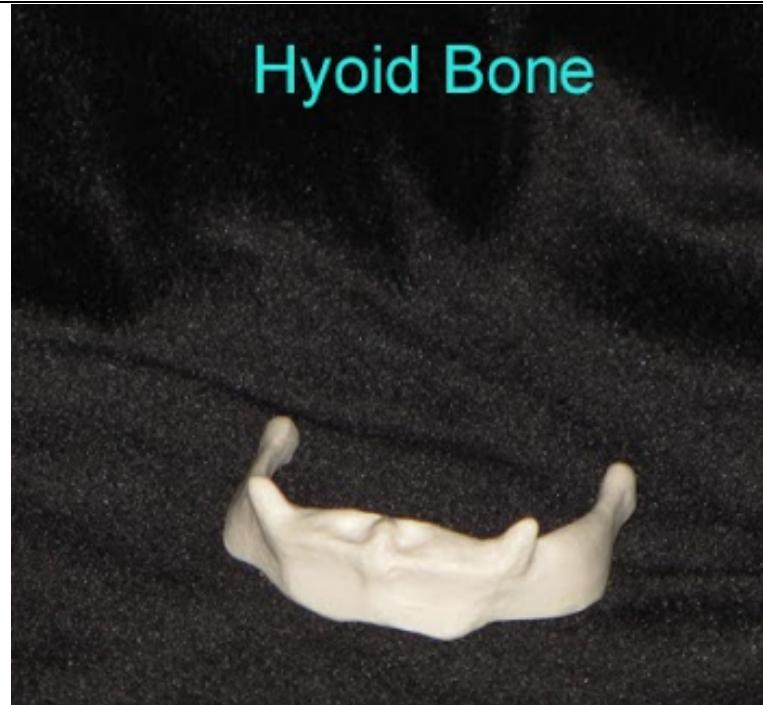
2.
Anterolateral
(sphenoidal)
fontanel
3.
Posterolateral
(mastoidal)
fontanel
*Remember
that the
posterior
fontanel
closes shortly
after birth
and is not
depicted on
our models.
*Frontal,
parietal,
temporal &
occipital
bones may
also be seen.



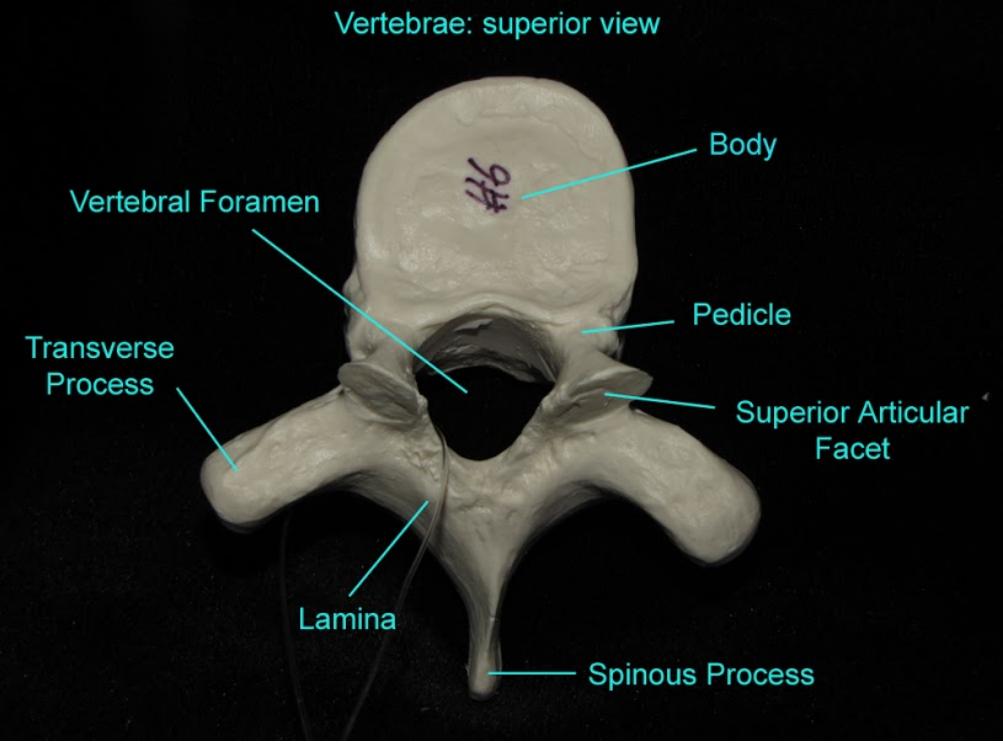
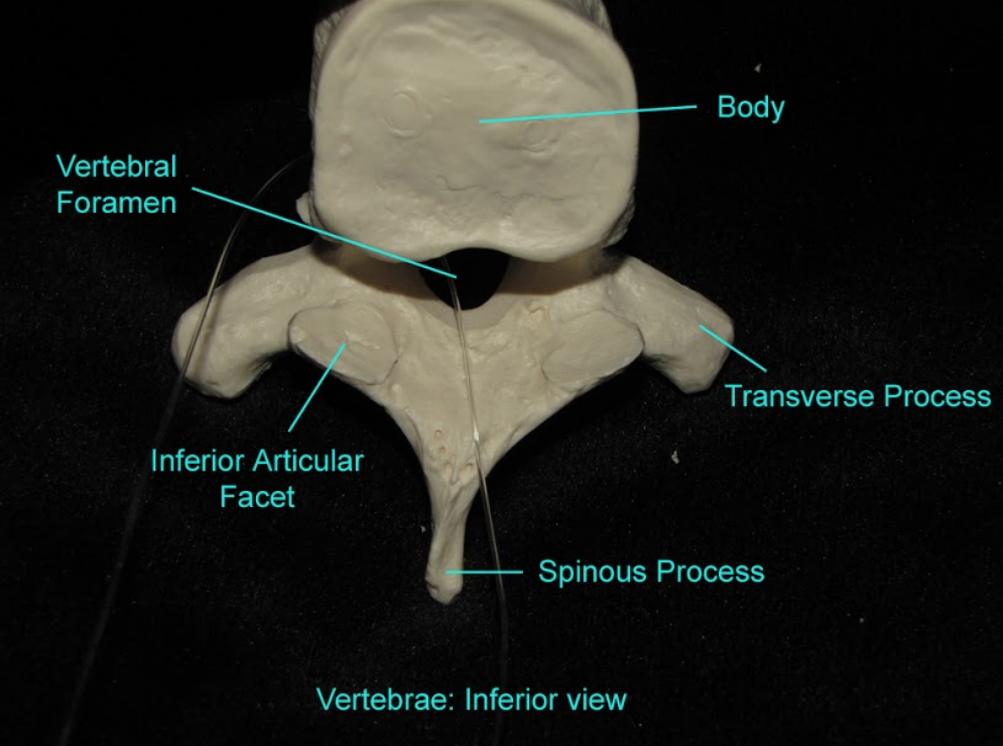
Hyoid Bone

Hyoid bone – suspended
from the styloid processes,
supports the tongue and
muscles for swallowing

Hyoid Bone



**Vertebrae – there are 5 types (cervical, thoracic, lumbar, sacral, and coccyx).
However, all vertebrae have these structures:**

<ol style="list-style-type: none"> 1. Body 2. Transverse process 3. Spinous process 4. Pedicle 5. Lamina 6. Superior articular facet (articulates with the inferior articular facet of the vertebra above). 7. Vertebral foramen 	 <p>Vertebrae: superior view</p> <ul style="list-style-type: none"> Body Vertebral Foramen Transverse Process Pedicle Superior Articular Facet Lamina Spinous Process
<ol style="list-style-type: none"> 8. Inferior articular facet, articulates with the superior articular facet of the vertebra below. <p>*The body, transverse processes, spinous process, and vertebral foramen are also seen here.</p>	 <p>Vertebrae: Inferior view</p> <ul style="list-style-type: none"> Body Vertebral Foramen Inferior Articular Facet Transverse Process Spinous Process

Between adjacent vertebrae, these structures are found:

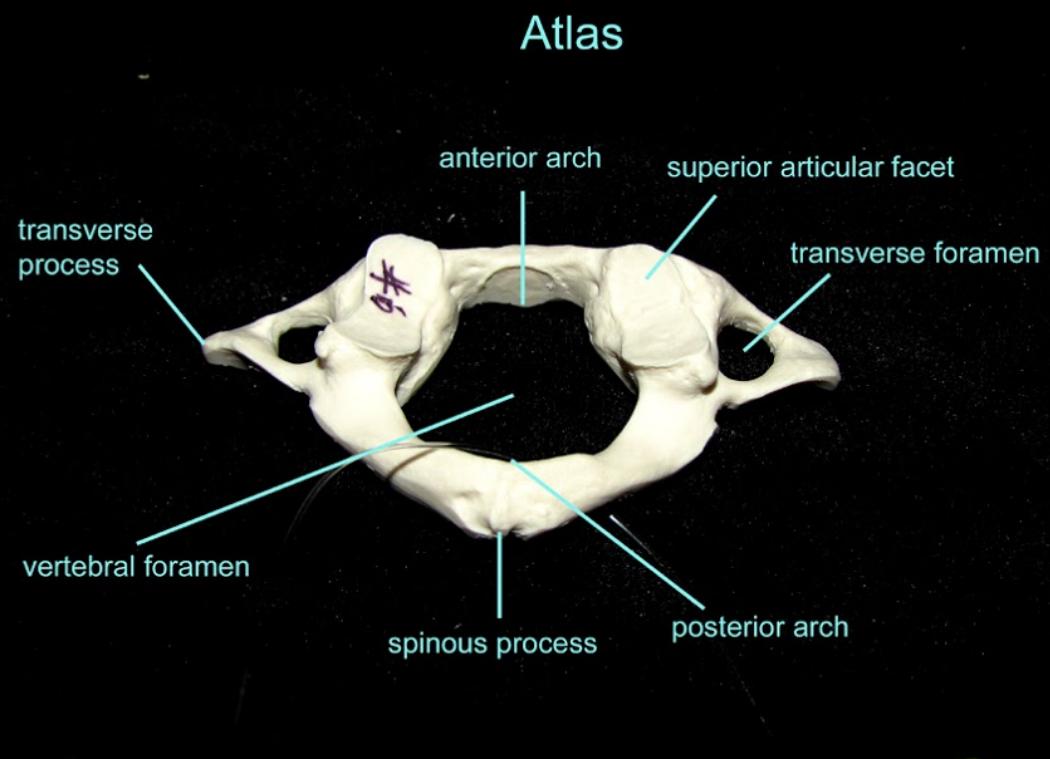
<p>1. Intervertebral disc (pad of fibrocartilage between bodies of adjacent vertebrae)</p> <p>2. Intervertebral foramen (opening between pedicles of adjacent vertebrae for spinal nerves leaving the cord)</p>	<p>Intervertebral foramen</p> <p>Vertebral body</p> <p>Nucleus pulposus</p> <p>Annulus fibrosus</p> <p>Normal intervertebral disc</p> <p>Compressed intervertebral disc in a weight-bearing situation</p>
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Cervical vertebrae (7) including atlas and axis:

<p>C2-C6</p> <p>1. Transverse foramen (only in cervical vertebrae, for vertebral artery and vein to brain)</p> <p>2. Spinous process is bifid or bifurcated (forked) on C2-C6</p>	<p>Vertebrae C2-C6</p> <p>Transverse foramen</p> <p>Bifid spinous processes</p>
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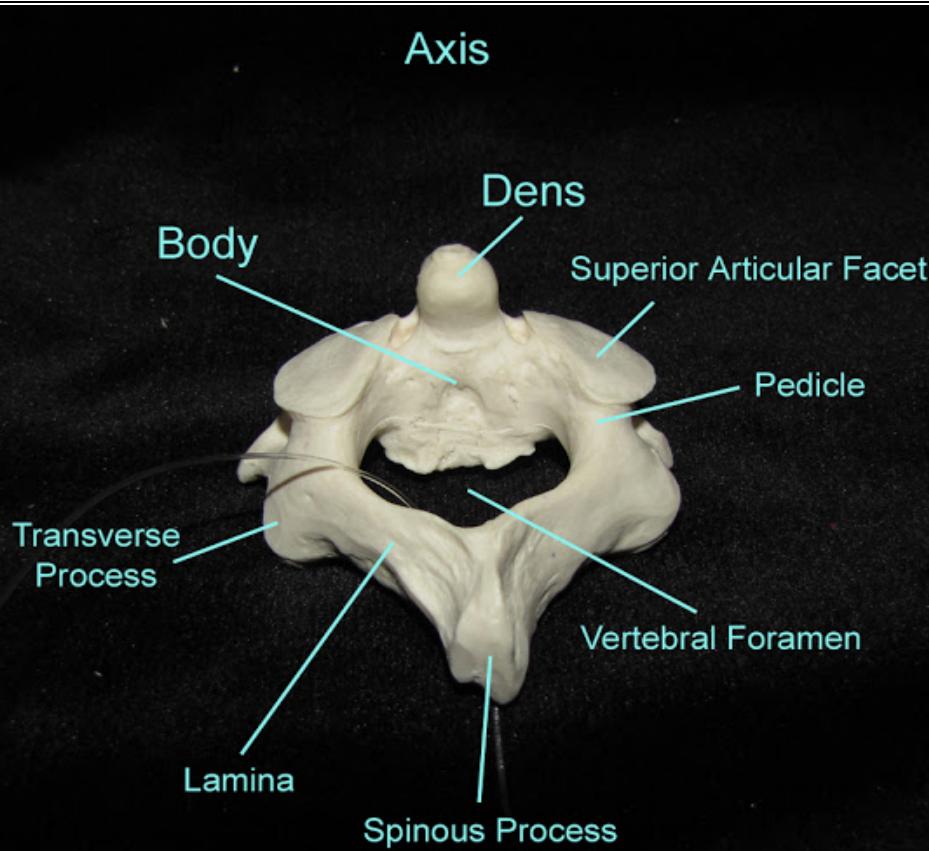
**Atlas- 1st
Cervical
Vertebra:**

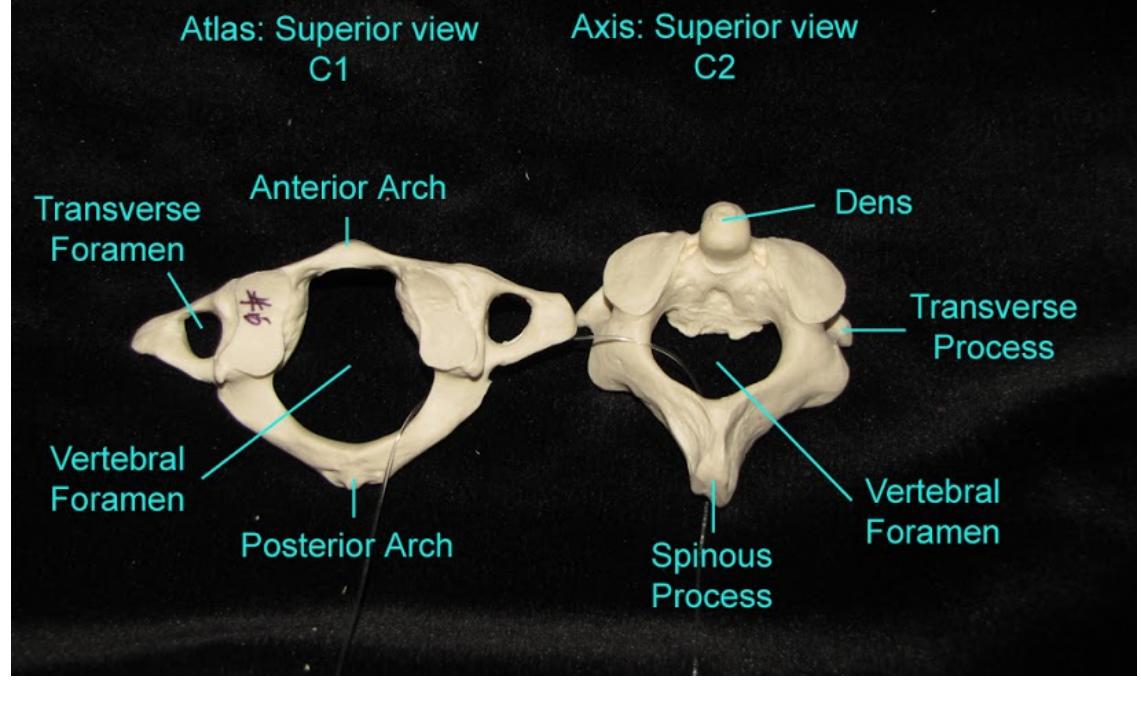
1.
Posterior arch
(replaces lamina and spinous process)
2. **Anterior arch**
(replaces body and pedicle)



**Axis- 2nd
Cervical
Vertebra:**

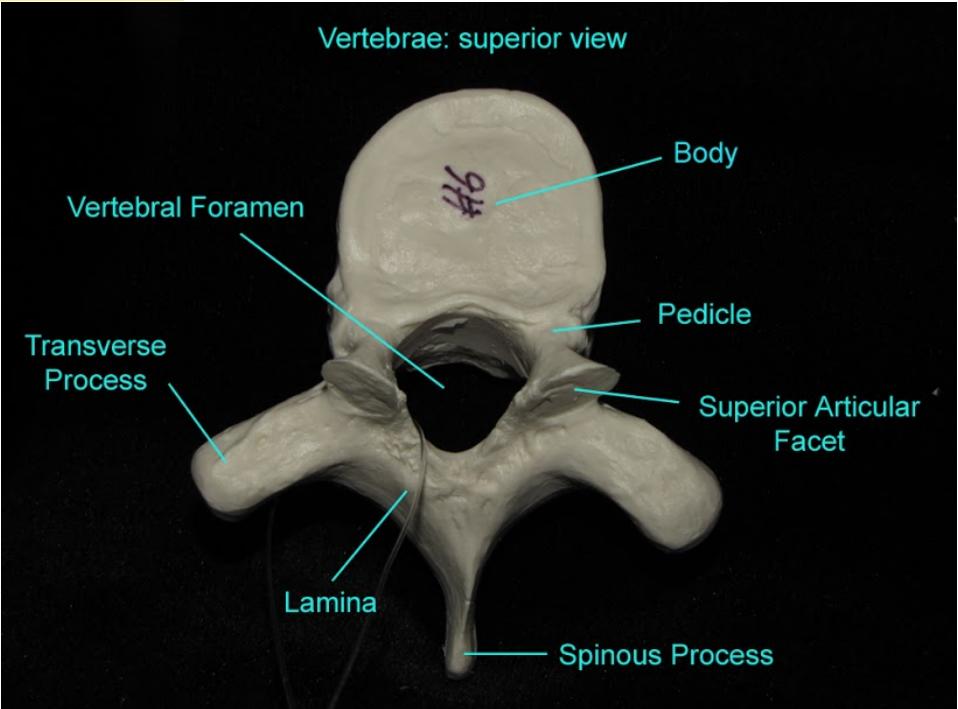
1. **Dens**
(odontoid process), provides pivot for atlas

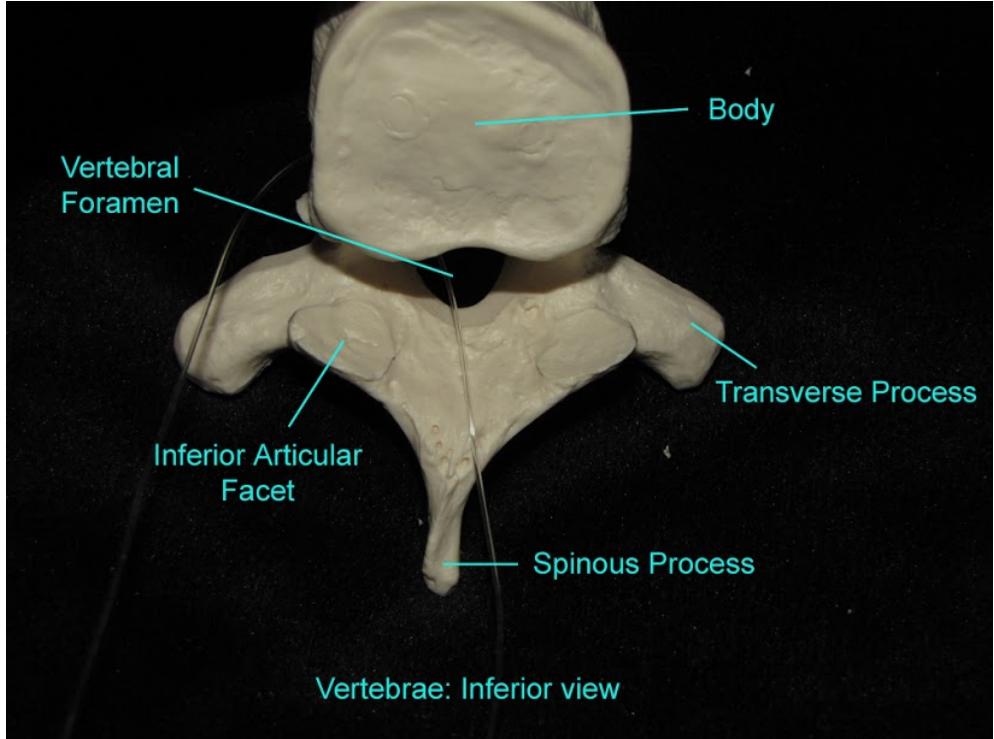
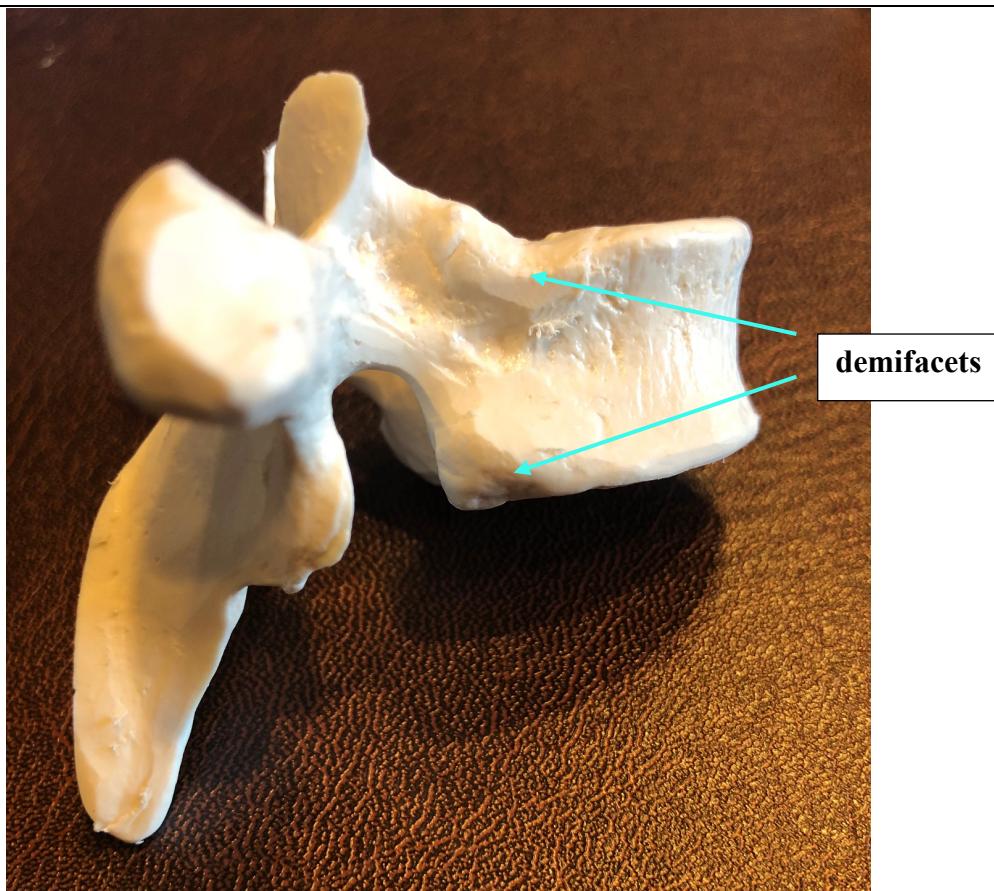




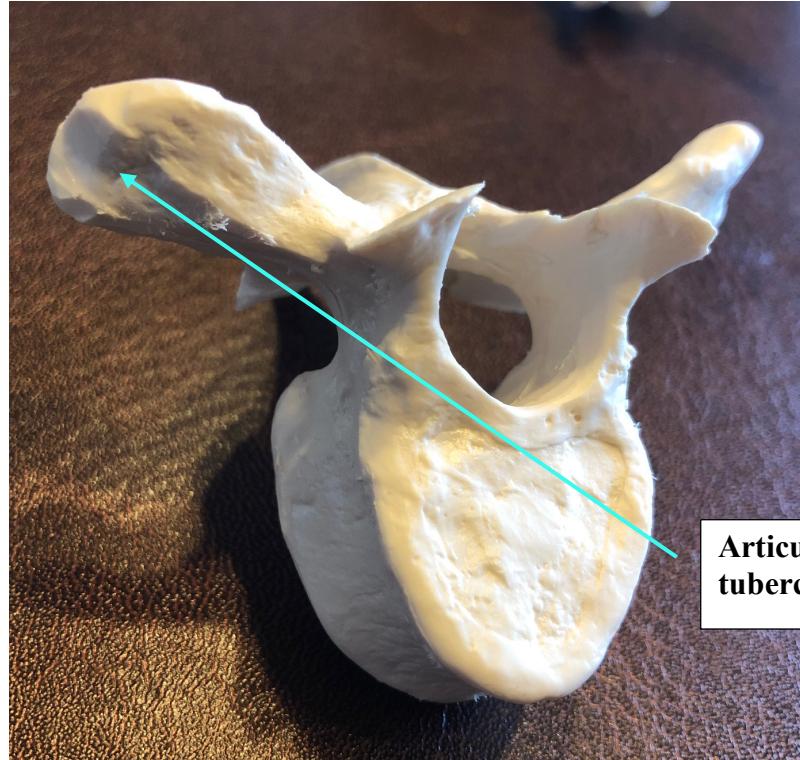
Thoracic vertebrae (12):

1. Body (larger than on cervical vertebrae)
2. Spinous process (longer, pointing more inferior, not bifid)
3. Transverse process (no transverse foramina)



<p>4. Inferior articular facet</p> <p>*the vertebral foramen, spinous process, transverse process and body may also be seen here.</p>	 <p>This image shows a posterior-inferior view of two vertebrae. The top vertebra's body is labeled 'Body'. A large opening between the processes is labeled 'Vertebral Foramen'. On the side of the second vertebra, there is a prominent process labeled 'Transverse Process'. A small, irregularly shaped depression on the side of the second vertebra is labeled 'Inferior Articular Facet'. A long, thin process extending downwards from the second vertebra is labeled 'Spinous Process'. The caption at the bottom reads 'Vertebrae: Inferior view'.</p>
<p>5. demifacets (on the body) – articulate with the head of the ribs.</p>	 <p>This image shows a posterior view of a single vertebra. The body of the vertebra has two distinct, smooth, oval-shaped depressions on its upper surface, which are labeled 'demifacets' in a callout box with arrows pointing to them. The vertebra is set against a dark, textured background.</p>

6. Articular facet for the tubercle of rib – on the transverse process.



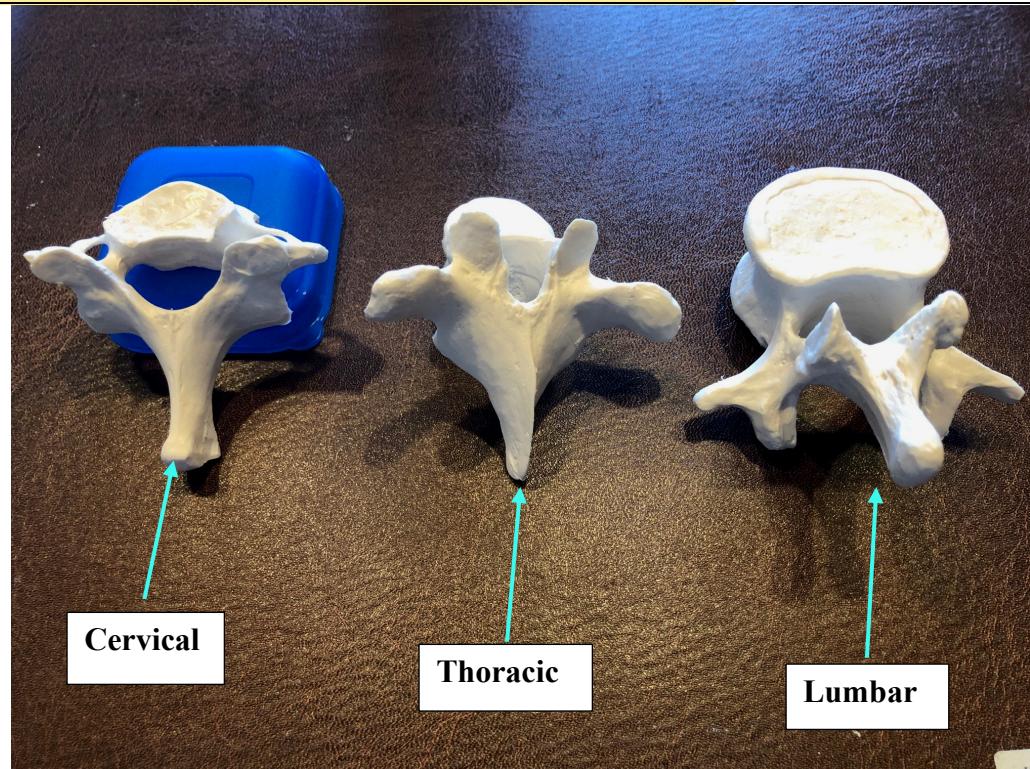
Lumbar vertebrae (5):

Differentiating features:
1. Body – broad and heavy
2. Spinous process – blunt and wide in lateral view



Comparison of Cervical, Thoracic and Lumbar Vertebrae:

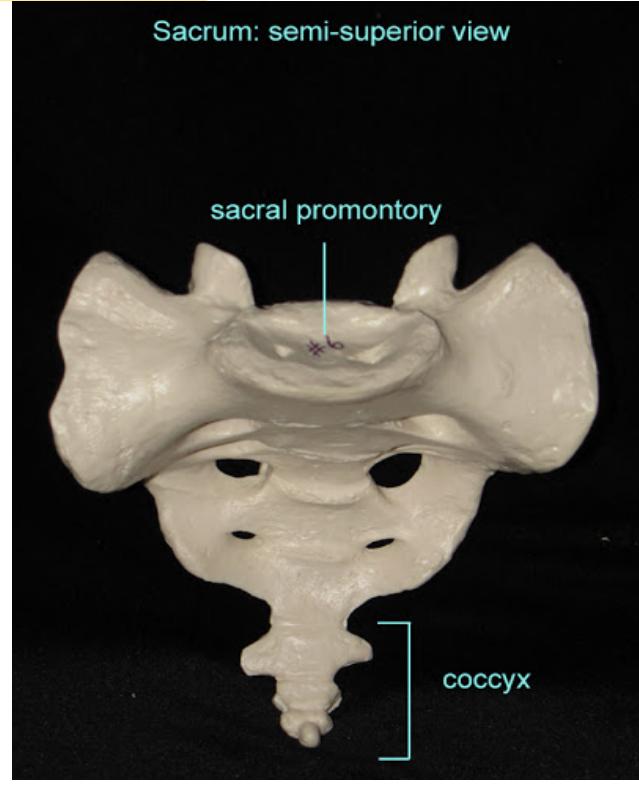
Click [HERE](#) for a short video to help you identify the differences between these 3 vertebrae.



Sacral vertebrae (5, fused into one bone = sacrum)

1. Sacral promontory

Sacrum: semi-superior view



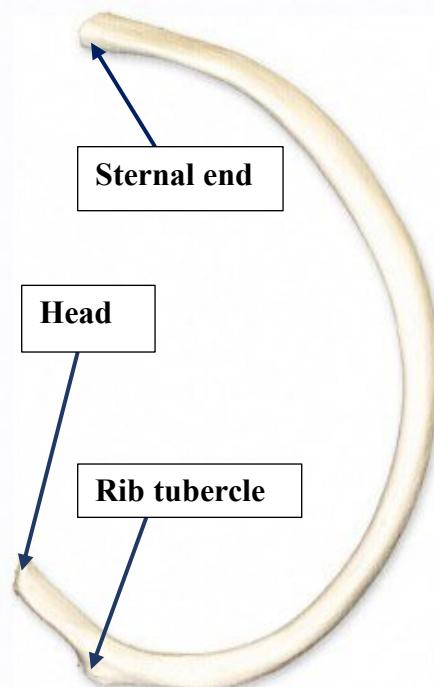
Coccyx (3-5 often fused):

Coccyx – posterior view



Ribs (12 pair):

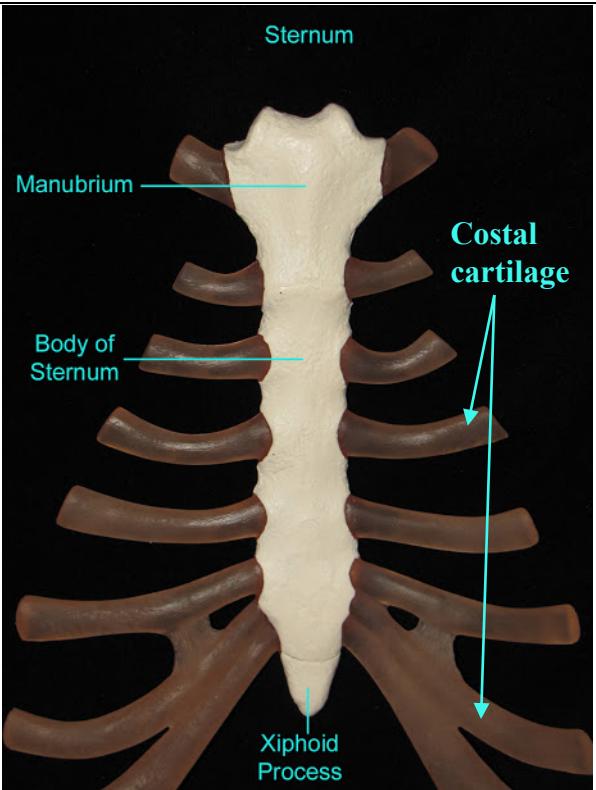
1. Head – articulates with the demifacets on the thoracic vertebrae
2. Rib tubercle – articulates with articular facet on the transverse process of thoracic vertebrae
3. Sternal end (has a facet for the costal cartilage)
4. Costal cartilage – found on extremity of all ribs (not depicted here – see sternum photo below)



Sternum, consists of 3 bones:

1. Manubrium
2. Body of sternum
3. Xiphoid process

* Costal cartilage (attaches rib to sternum) is depicted here.



Rib Groupings:

- A. True Ribs (1-7) – costal cartilage attaches directly to the sternum
- B. False Ribs (8-10) – costal cartilage attaches to each other and then to that of the 7th rib.
- C. Floating Ribs (11-12) – anterior end does not attach to sternum

