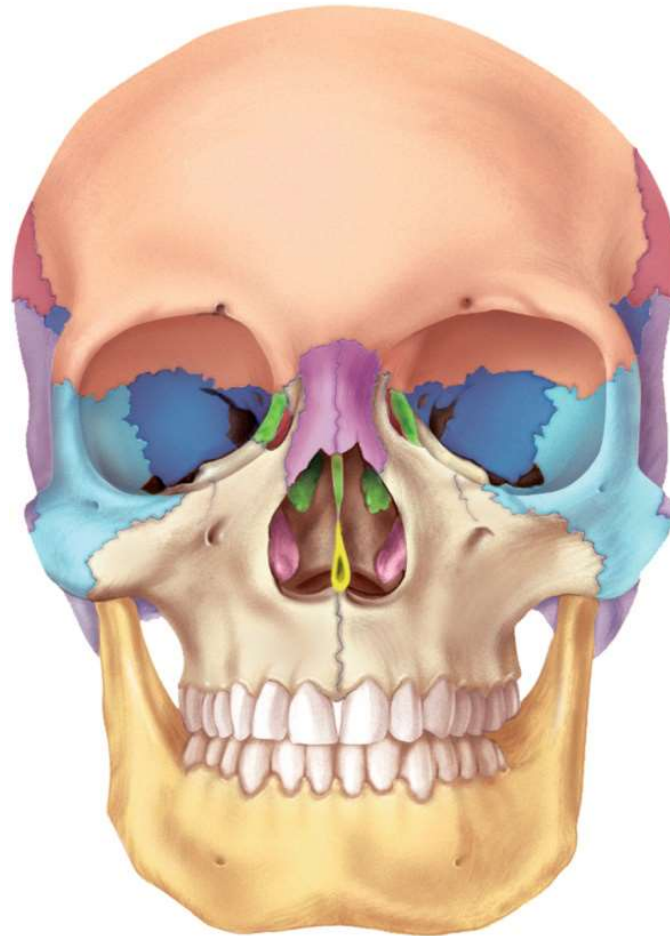


Chapter 8.2

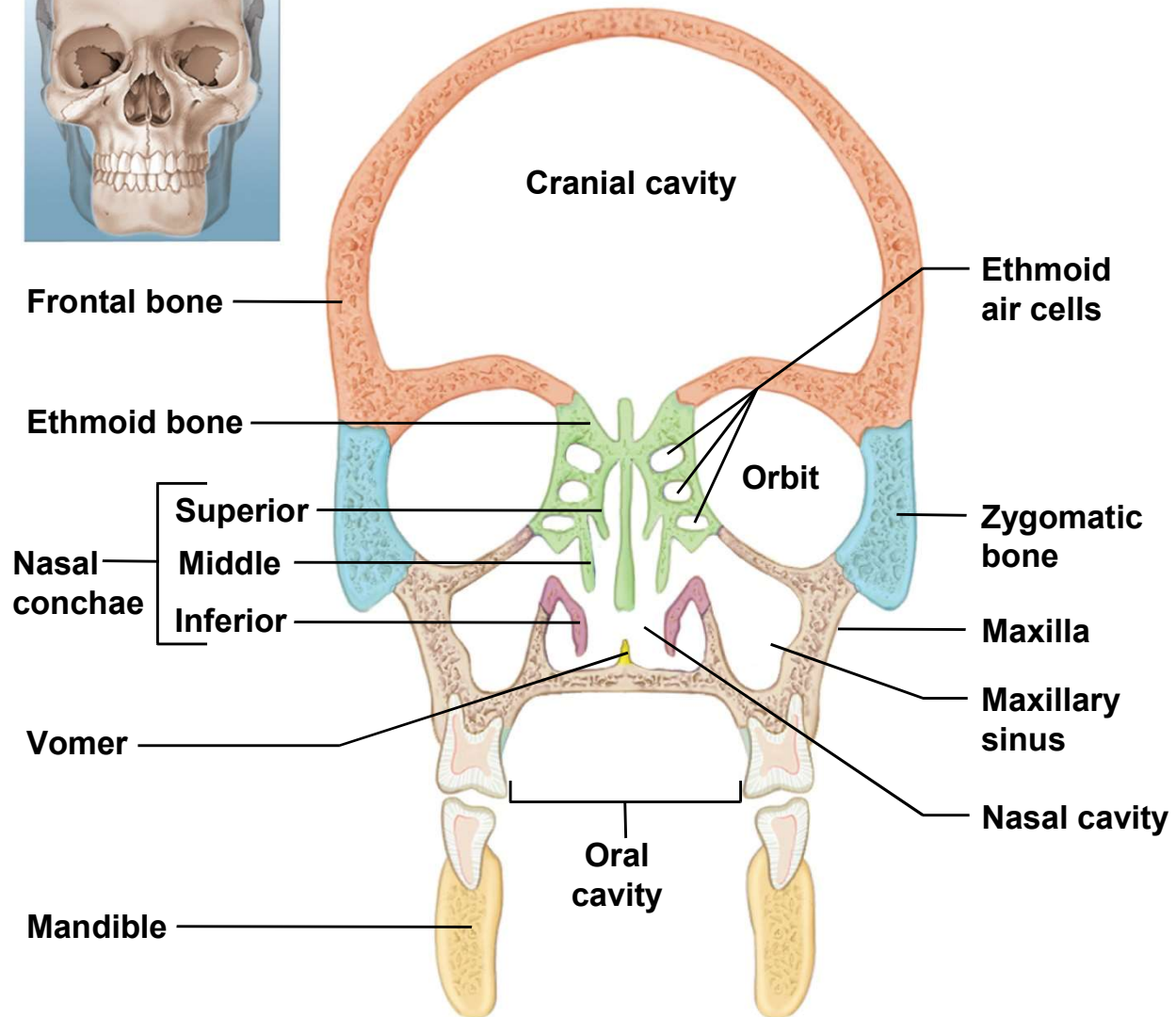
The Skull



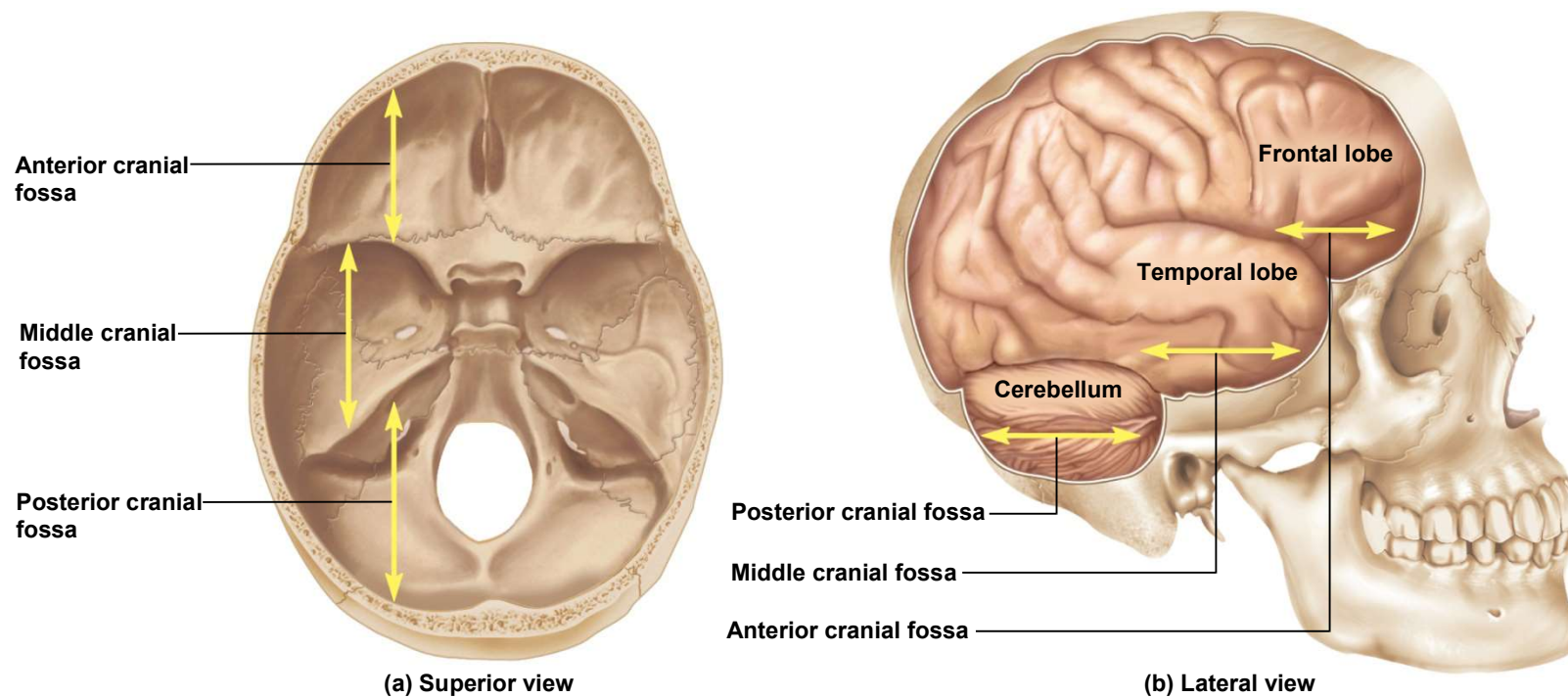
The Skull

- **skull** – the most complex part of the skeleton
- **22 bones** joined together by **sutures** (immovable joints)
- **8 cranial bones** surround **cranial cavity** which encloses the **brain**
- **other cavities** – orbits, nasal cavity, oral (buccal) cavity, middle-, and inner ear cavities, and paranasal sinuses
- **paranasal sinuses** – frontal, sphenoid, ethmoid, and maxillary
 - lined by mucous membrane and air-filled
 - lighten the anterior portion of the skull
 - act as chambers that add resonance to the voice
- **foramina** – holes that allow passage for nerves and blood vessels
- **14 facial bones** support teeth, facial and jaw muscles

Major Skull Cavities



Cranial Fossa

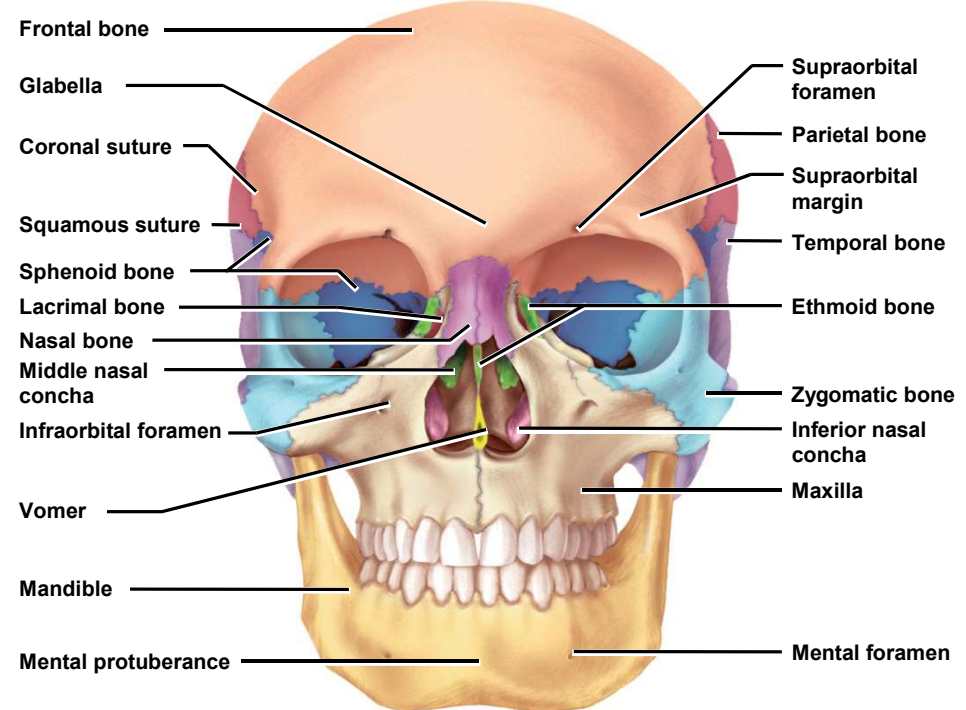


- **cranium (braincase)** – protects the brain and associated sense organs
 - swelling of the brain inside the rigid cranium may force tissue through foramen magnum resulting in death
 - consists of two parts: the **calvaria** (skullcap) and the cranial **base**
- **base** is divided into three basins that comprise the cranial floor
 - **anterior cranial fossa** holds the frontal lobe of the brain
 - **middle cranial fossa** holds the temporal lobes of the brain
 - **posterior cranial fossa** contains the cerebellum

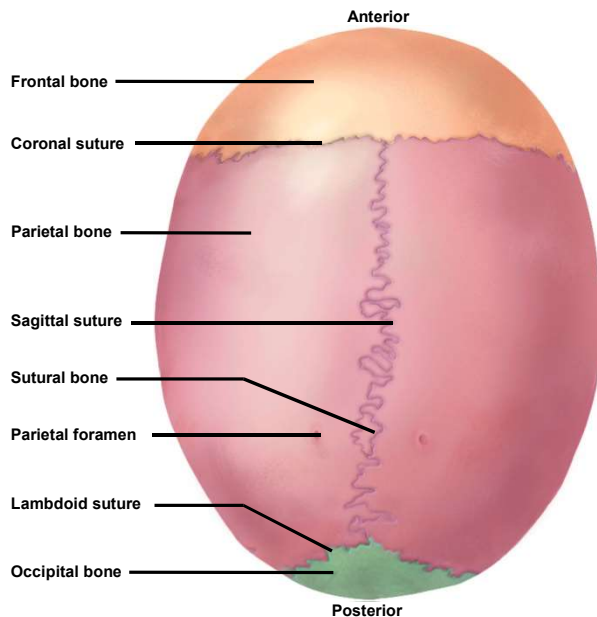
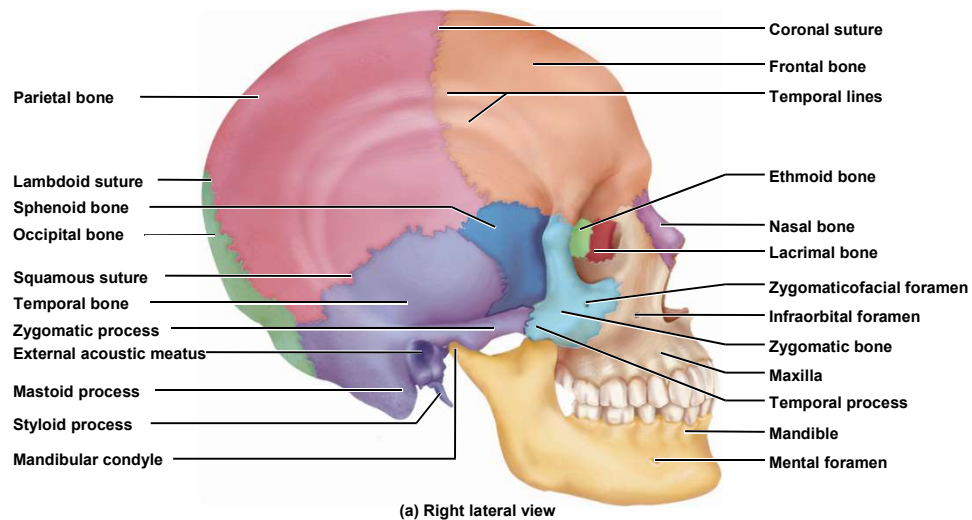
Frontal Bone

- forms **forehead** and part of the roof of the cranium
- **coronal suture** – posterior boundary of frontal bone
- **supraorbital margin** forms roof of the orbit
- **supraorbital foramen** provides passage for nerve, artery, and vein
- **glabella** – smooth area above root of the nose
- contains **frontal sinus**

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Parietal Bone



- form most of cranial roof and part of its lateral walls
- bordered by **4 sutures**
 - **sagittal** – between parietal bones
 - **coronal** – at anterior margin
 - **lambdoid** – at posterior margin
 - **squamous** – at lateral border
- two **temporal lines** serve as attachment of the temporalis muscle

Temporal Bone

- lateral wall and part of floor of cranial cavity

- **squamous part**

- encircled by squamous suture
- **zygomatic process**
- **mandibular fossa**

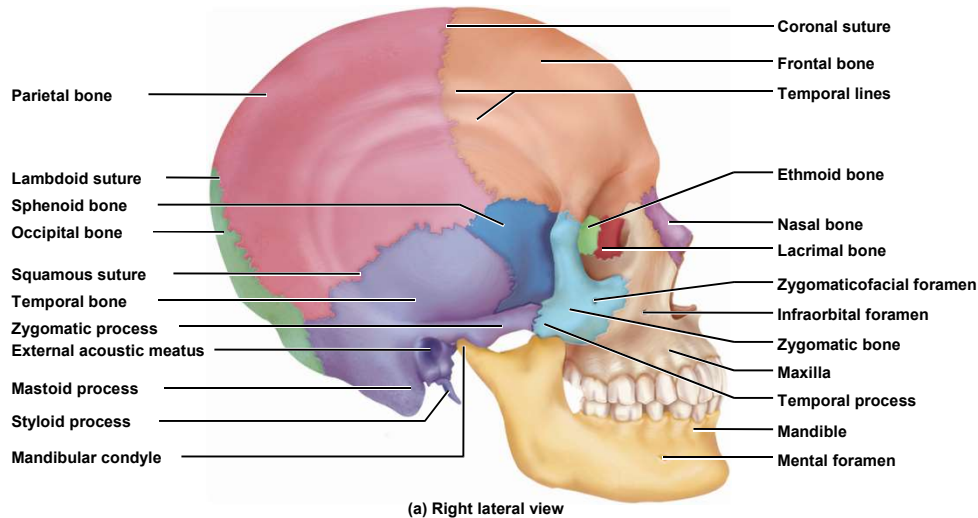
- **tympanic part**

- **external auditory meatus**
- **styloid process**

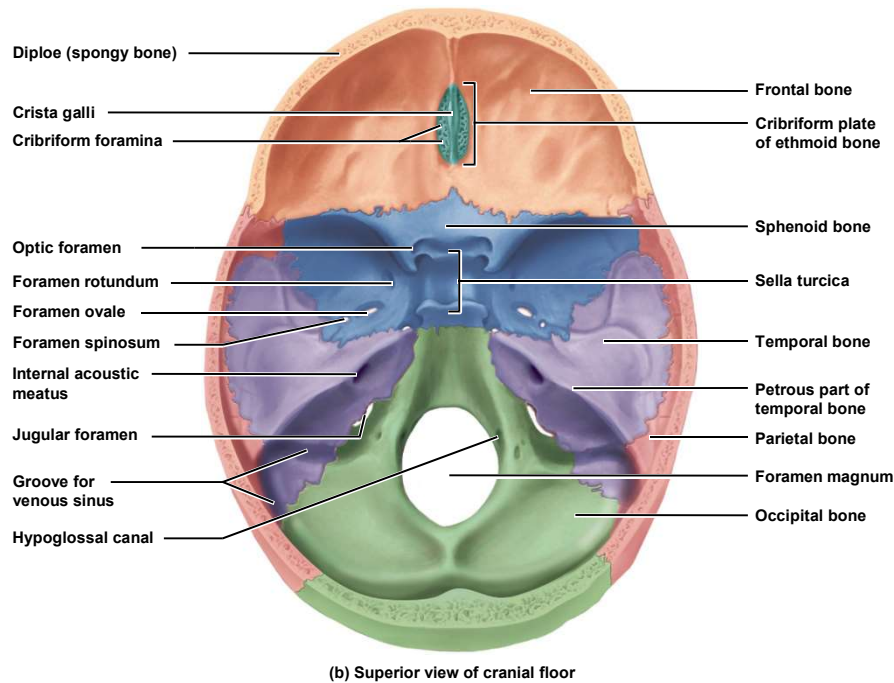
- **mastoid part**

- **mastoid process**
 - mastoiditis from ear infection
- **mastoid notch**
- **stylomastoid foramen**
- **mastoid foramen**

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Petrous Portion of Temporal Bone

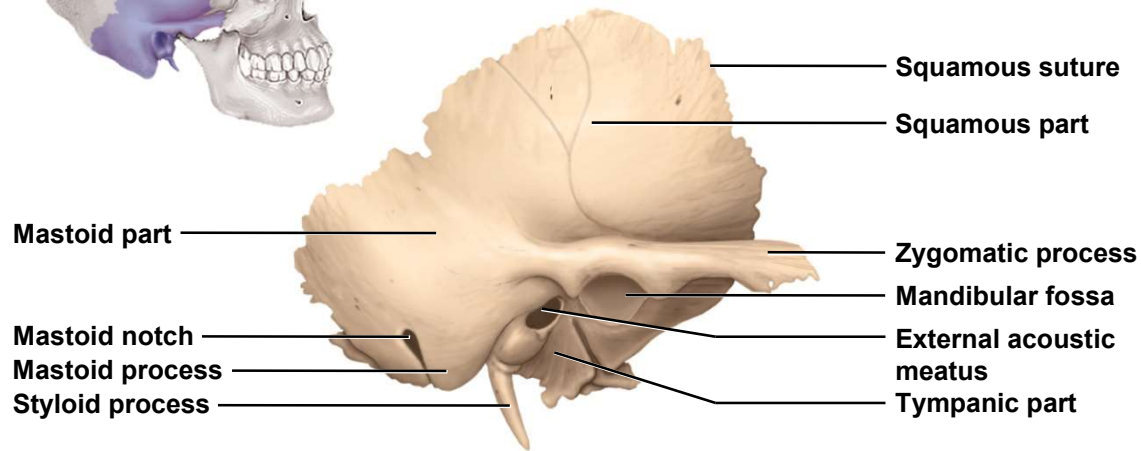
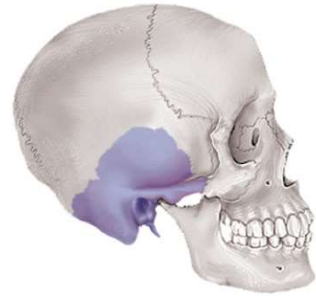


– petrous part

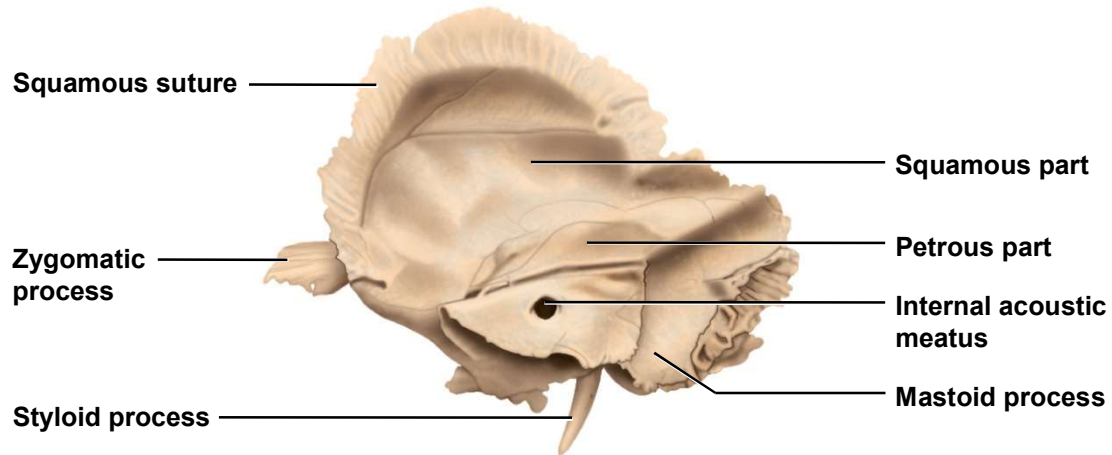
- part of cranial floor
- separates middle from posterior cranial fossa
- houses middle and inner ear cavities
- receptors for hearing and sense of balance
- **internal auditory meatus**
 - opening for CN VII (vestibulocochlear nerve)
- **carotid canal**
- **jugular foramen**

Right Temporal Bone

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(a) Lateral surface

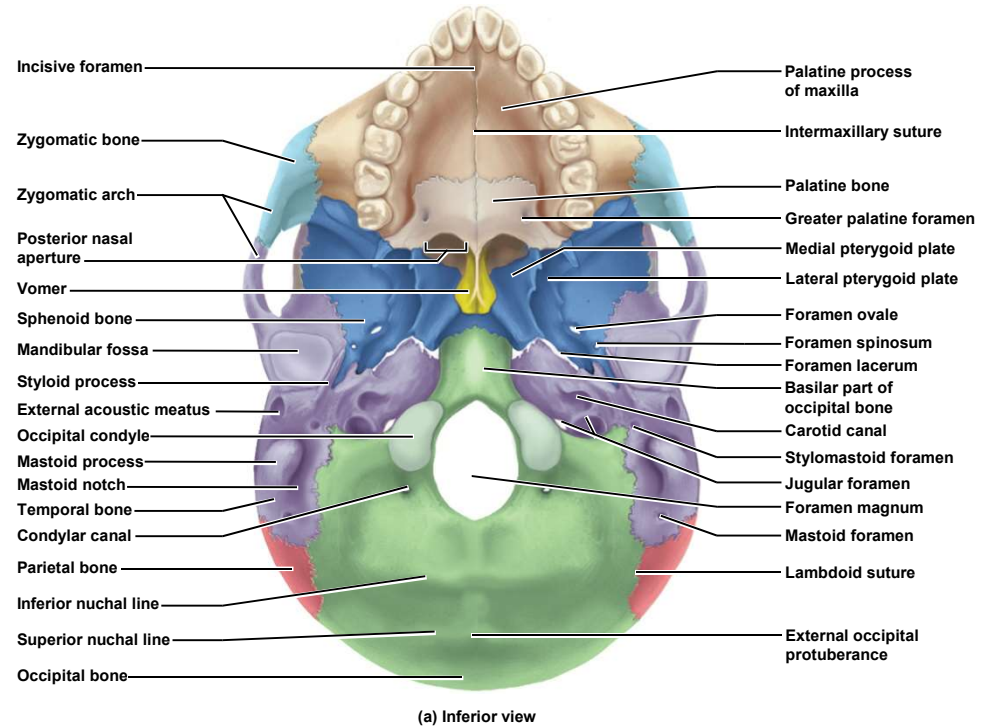


(b) Medial surface

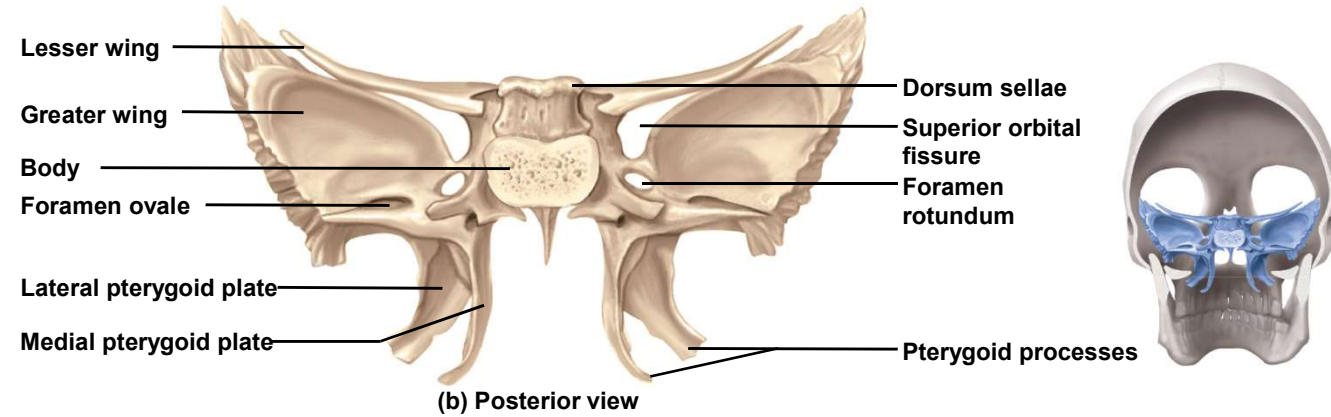
Occipital Bone

- rear and base of skull
- **foramen magnum** holds spinal cord
- **basilar part**
- skull rests on atlas at **occipital condyles**
- **hypoglossal canal** transmits hypoglossal nerve (CN XII) supplying tongue muscles
- **condylar canal**
- **external occipital protuberance** for nuchal ligament
- **superior and inferior nuchal lines** mark neck muscles

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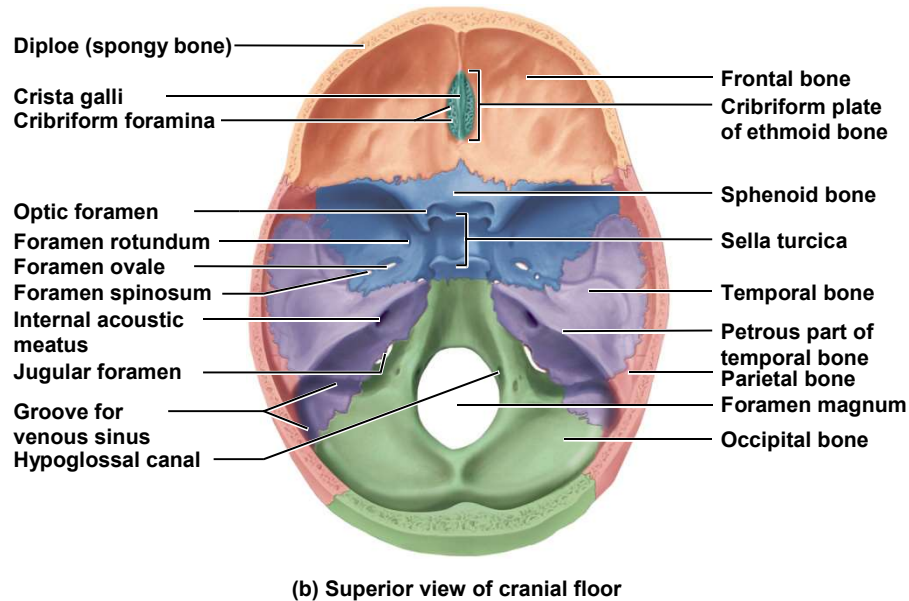


Sphenoid Bone

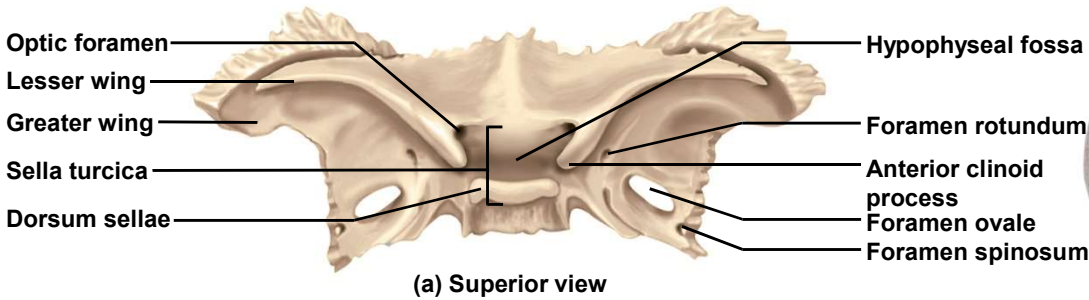


- body
- greater wing
- lesser wing
- optic foramen
- anterior clinoid processes
- superior orbital fissure

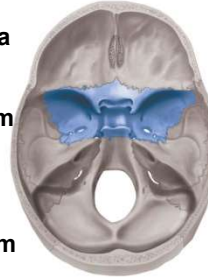
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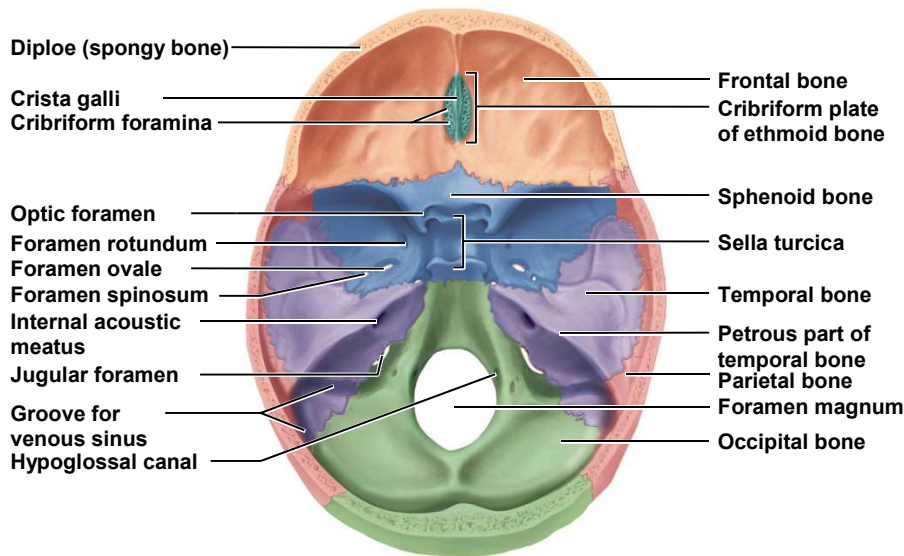
Sphenoid Bone



(a) Superior view

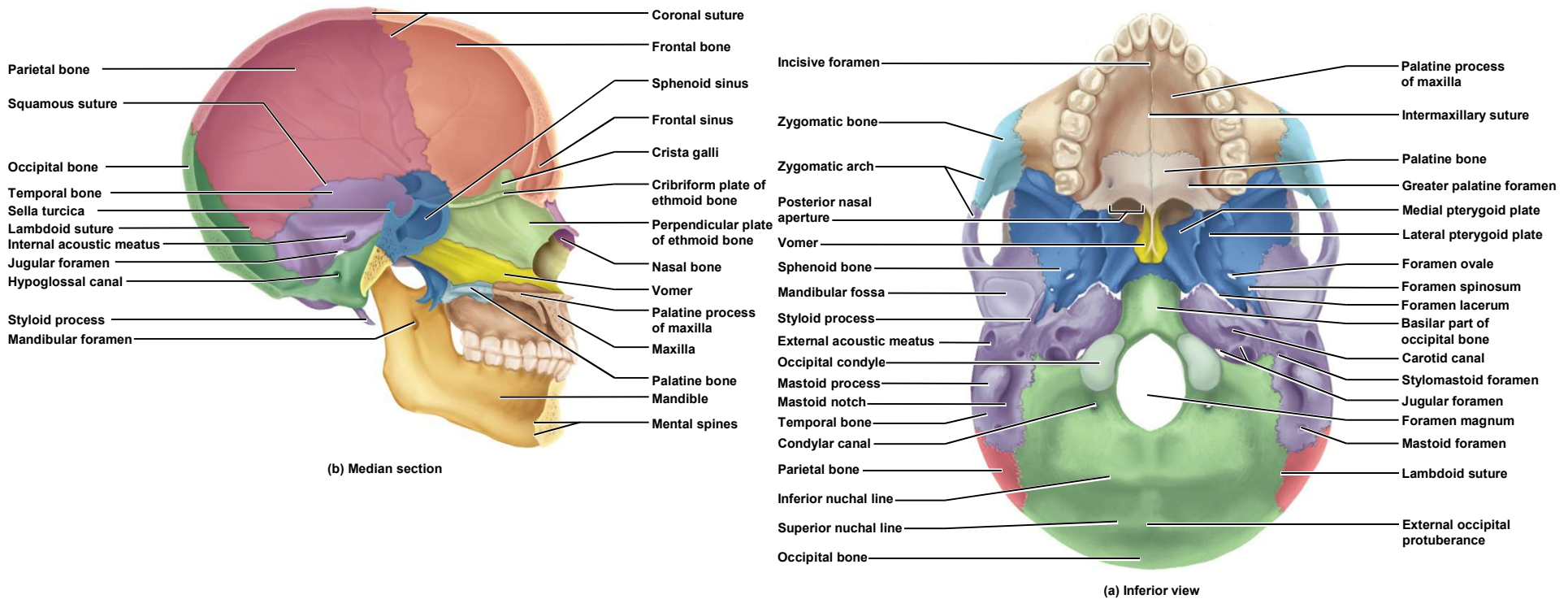


- foramen rotundum
- foramen ovale
- foramen lacerum
- posterior nasal apertures or choanae
- medial pterygoid plate
- lateral pterygoid plate
- sphenoid sinus



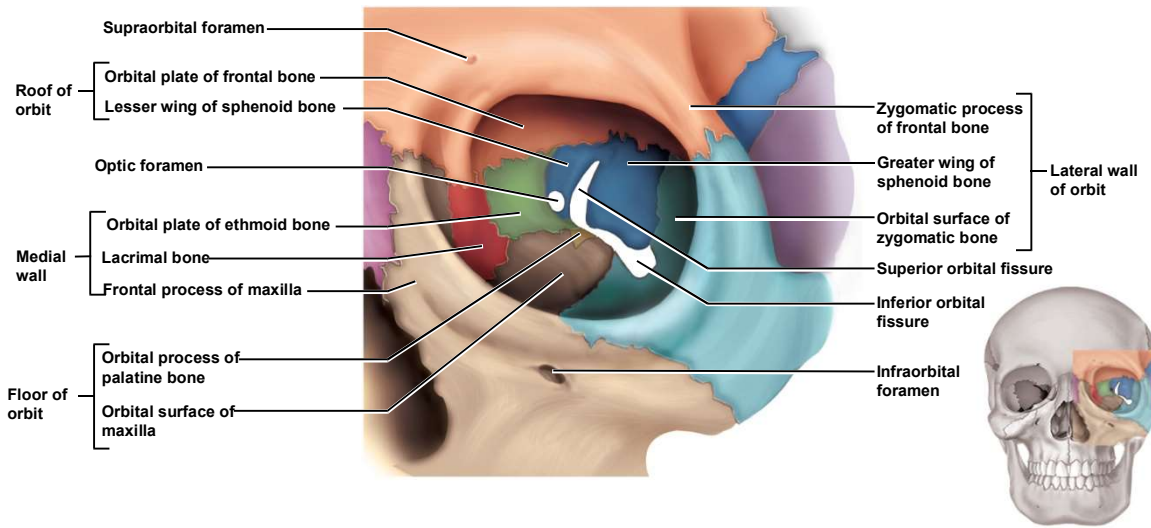
(b) Superior view of cranial floor

Sphenoid Bone

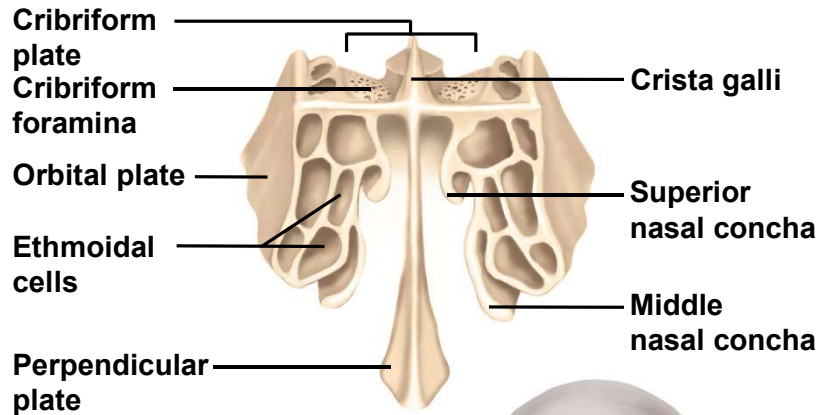


Note sphenoid sinus

Ethmoid Bone

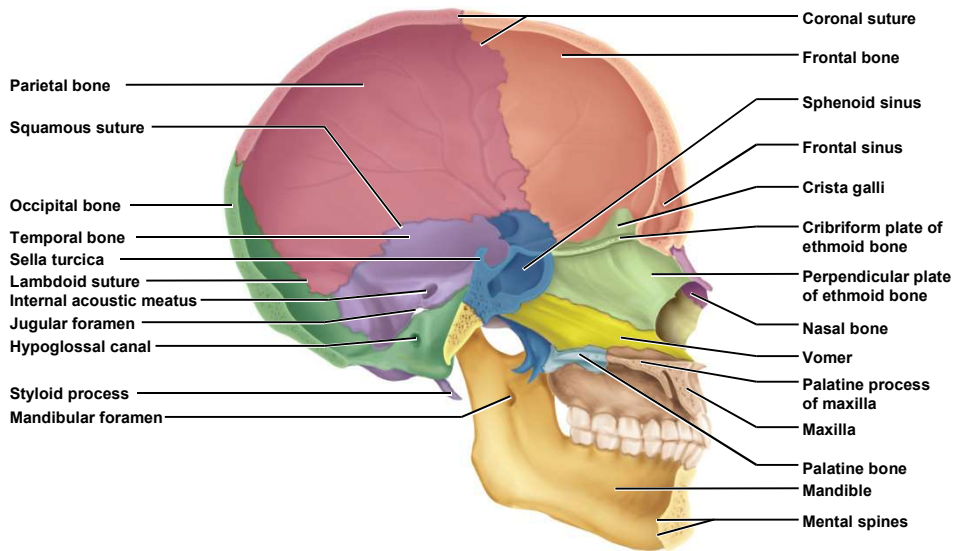


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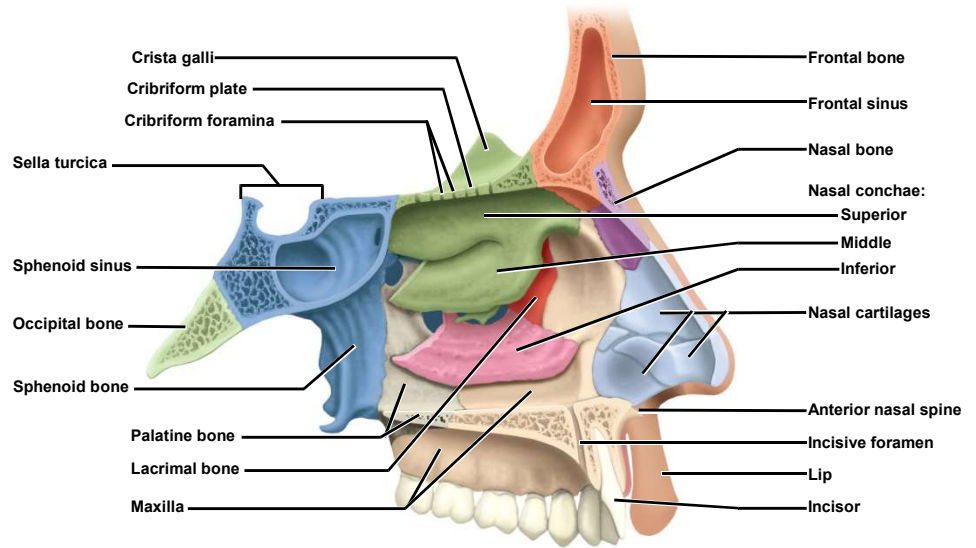


- between the eyes
- contributes to medial wall of orbit
- lateral walls and roof of nasal cavity, and nasal septum
- **three major portions** of this porous, delicate bone
 - **perpendicular plate** forms superior two-thirds of nasal septum
 - **cribriform plate** – forms roof of nasal cavity
 - **crista galli** – attachment point for meninges
 - **cribriform (olfactory) foramina**
 - **labyrinth** – large mass on each side of perpendicular plate
 - **ethmoid cells** in the make up ethmoid sinuses
 - **orbital plate**

Ethmoid Bone



(b) Median section



superior and middle concha
 perpendicular plate of nasal septum

Facial Bones

- **facial bones (14)**– those that have no direct contact with the brain or meninges
 - support the teeth
 - give shape and individuality to the face
 - form part of the orbital and nasal cavities
 - provide attachments for muscles of facial expression and mastication

2 maxillae

2 palatine bones

2 zygomatic bones

2 lacrimal bones

2 nasal bones

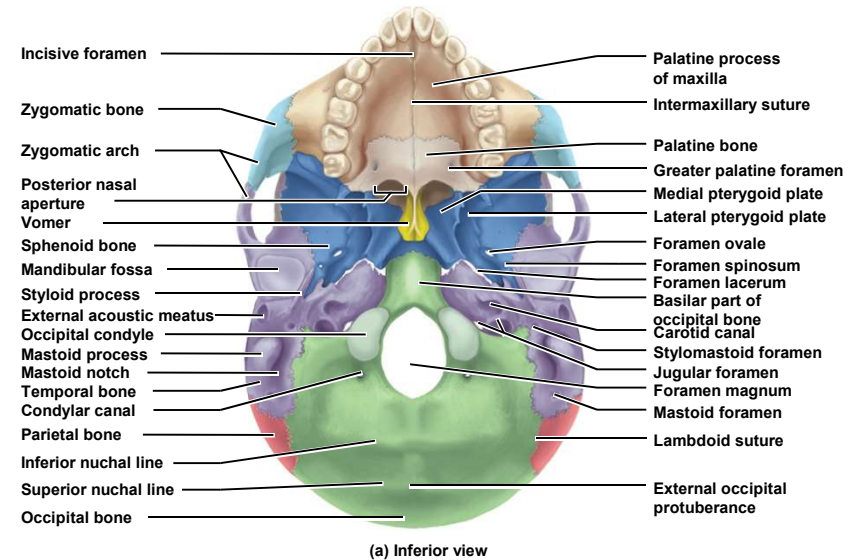
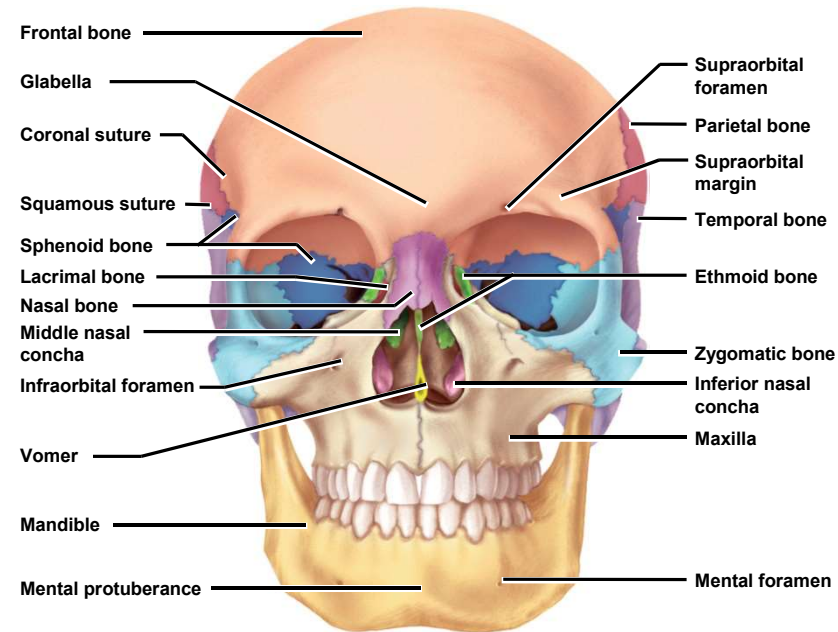
2 inferior nasal conchae

1 vomer

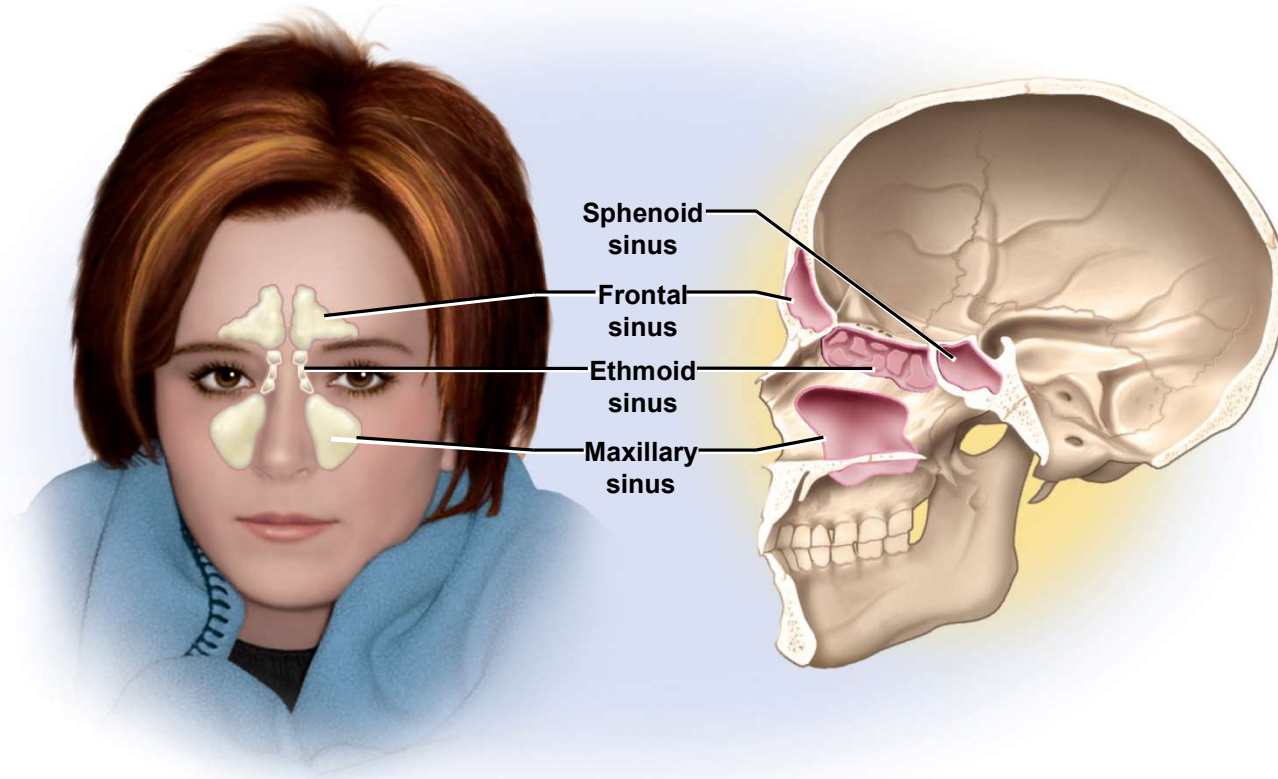
1 mandible

Maxillary Bones

- largest facial bones
- forms upper jaw and meet each other at a median ***intermaxillary suture***
 - **alveolar processes** are bony points between teeth
 - **alveolus** - sockets that hold teeth
- forms inferomedial wall of orbit
 - **infraorbital foramen**
 - **inferior orbital fissure**
- forms most of the hard palate
 - **palatine process**
 - **palate** – forms the roof of the mouth and floor of nasal cavity
 - **incisive foramen**
 - palate allows us to chew while breathing
 - ***cleft palate*** and ***cleft lip***



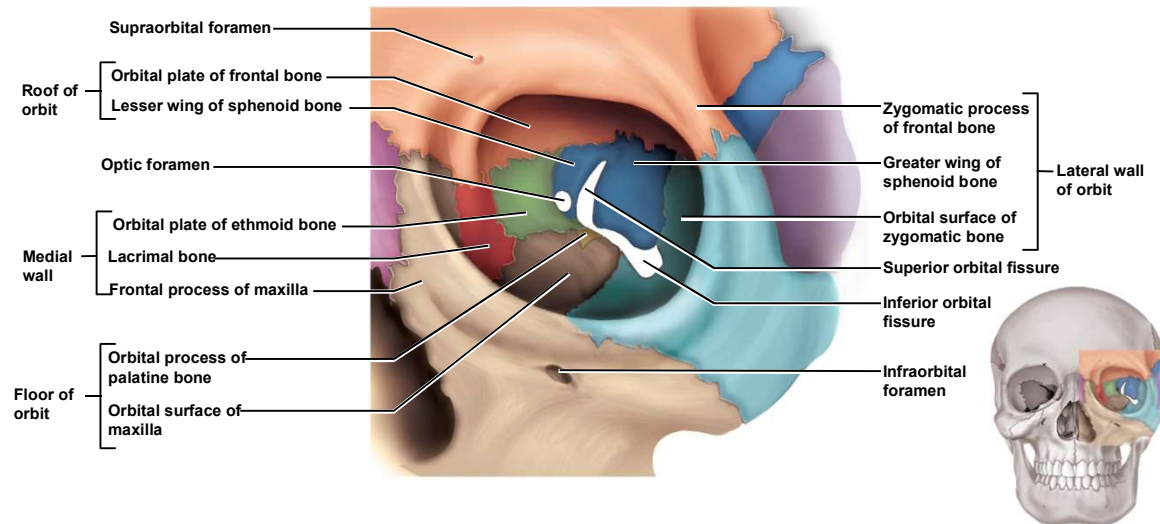
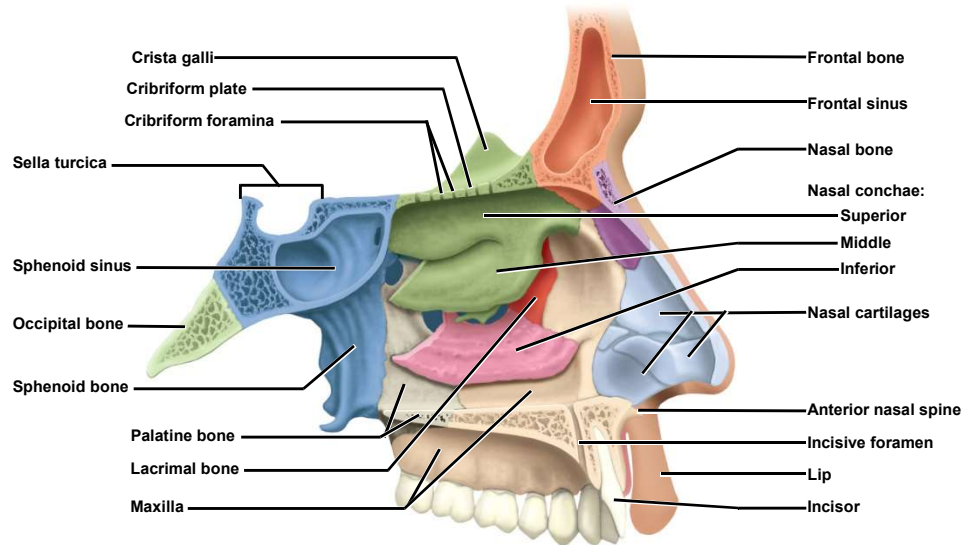
Location of Maxillary Sinus



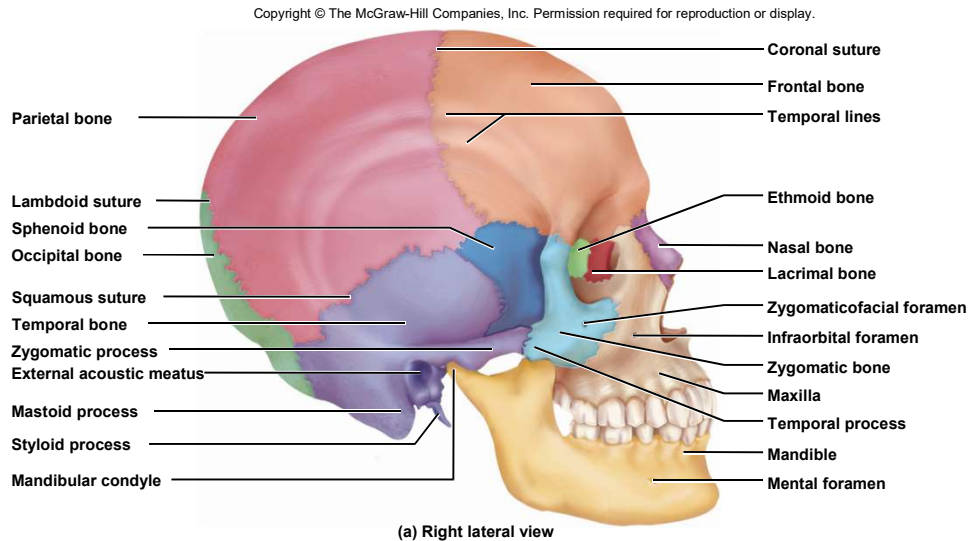
- **maxillary sinus** fills maxillae bone
- larger in volume than frontal, sphenoid and ethmoid sinuses

Palatine Bones

- L-shaped bone
- form the posterior portion of the hard palate
- part of lateral nasal cavity wall
- part of the orbital floor
- **greater palatine foramina**

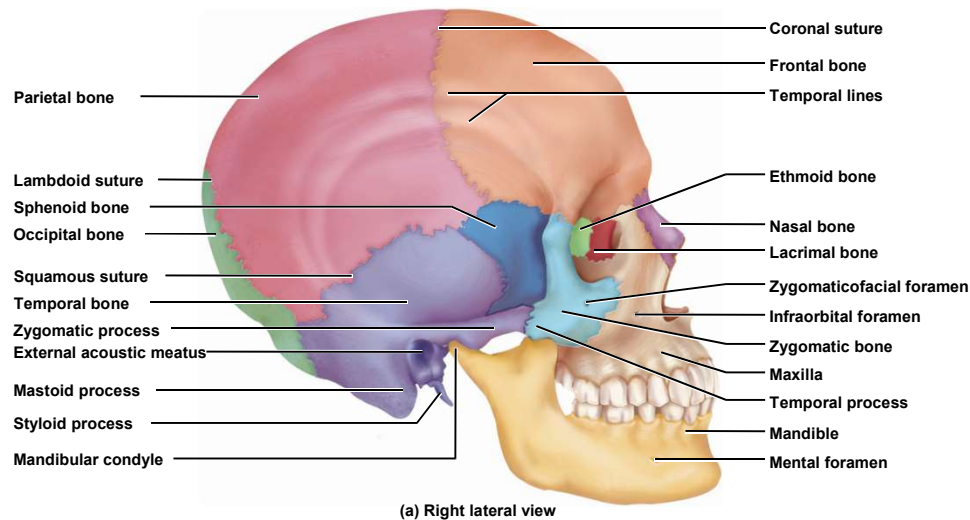


Zygomatic Bones



- forms angles of the cheekbones and part of lateral orbital wall
- **zygomaticofacial foramen**
- **zygomatic arch is formed from *temporal process of zygomatic bone* and *zygomatic process of temporal bone***

Lacrimal Bones

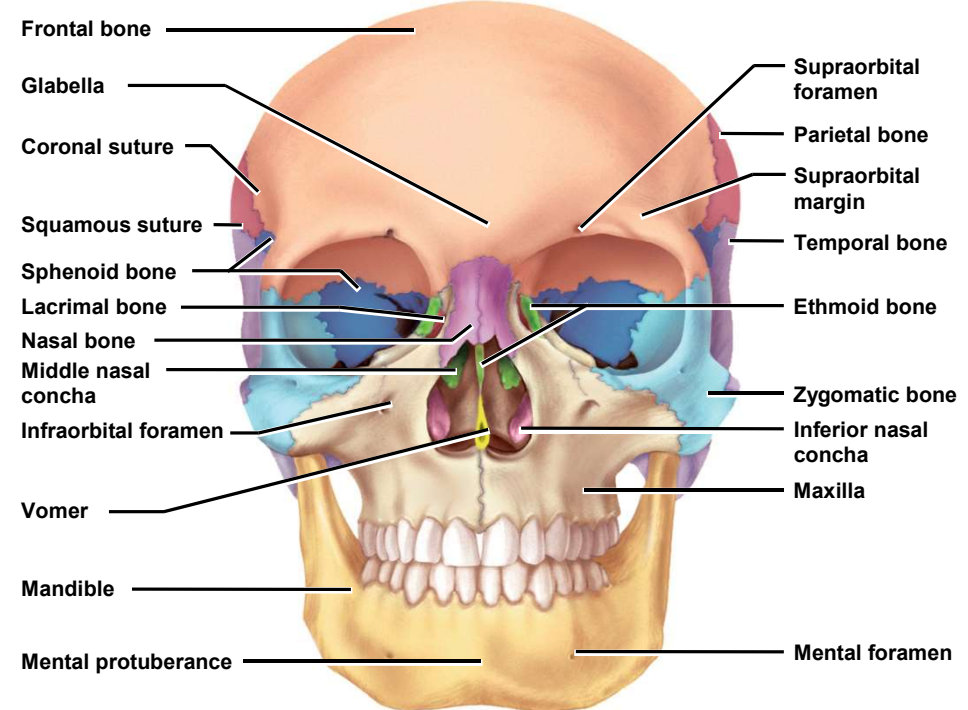


- form part of medial wall of each orbit
- smallest bone of skull
- **lacrimal fossa** houses lacrimal sac in life
 - tears collect in lacrimal sac and drain into nasal cavity

Nasal Bones

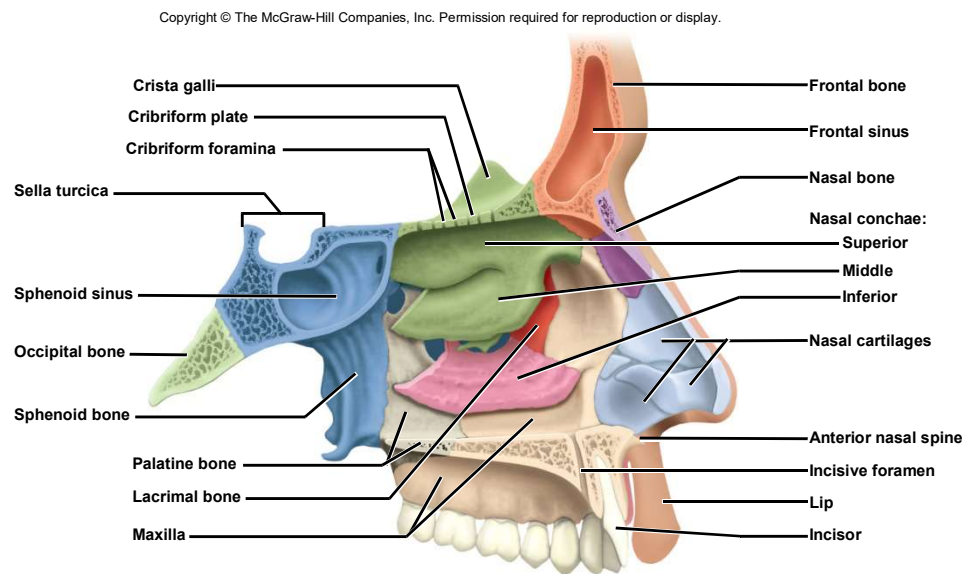
- forms bridge of nose
- supports cartilages that shape lower portion of the nose
- often fractured by blow to the nose

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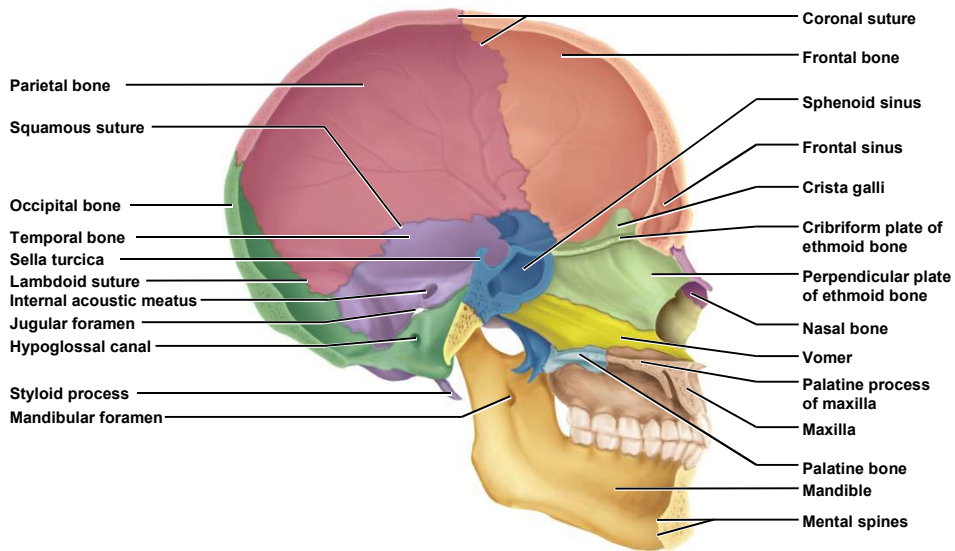


Inferior Nasal Conchae

- three conchae in the nasal cavity
 - superior and middle are part of the ethmoid bone
- **inferior nasal concha** is a separate bone
- largest of the three



Vomer

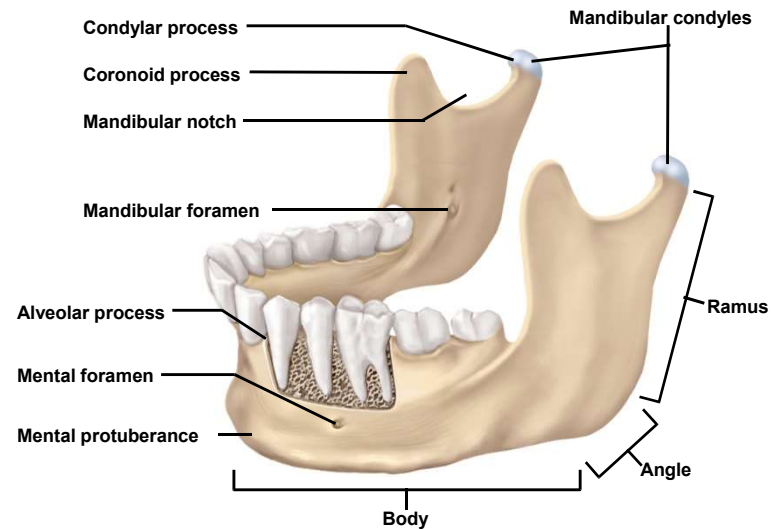
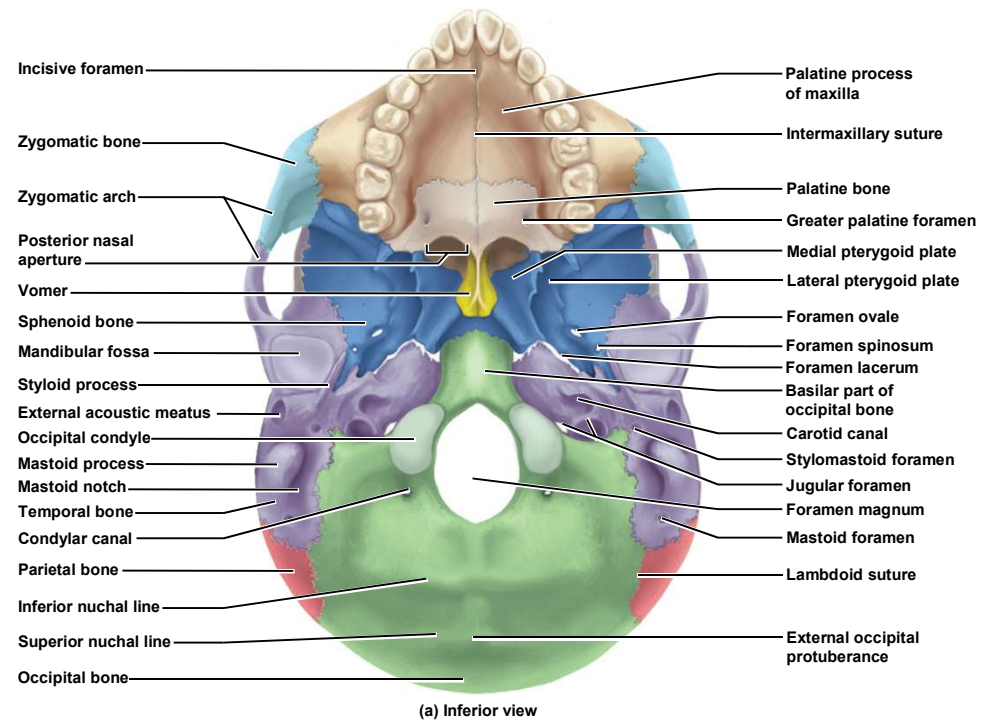


(b) Median section

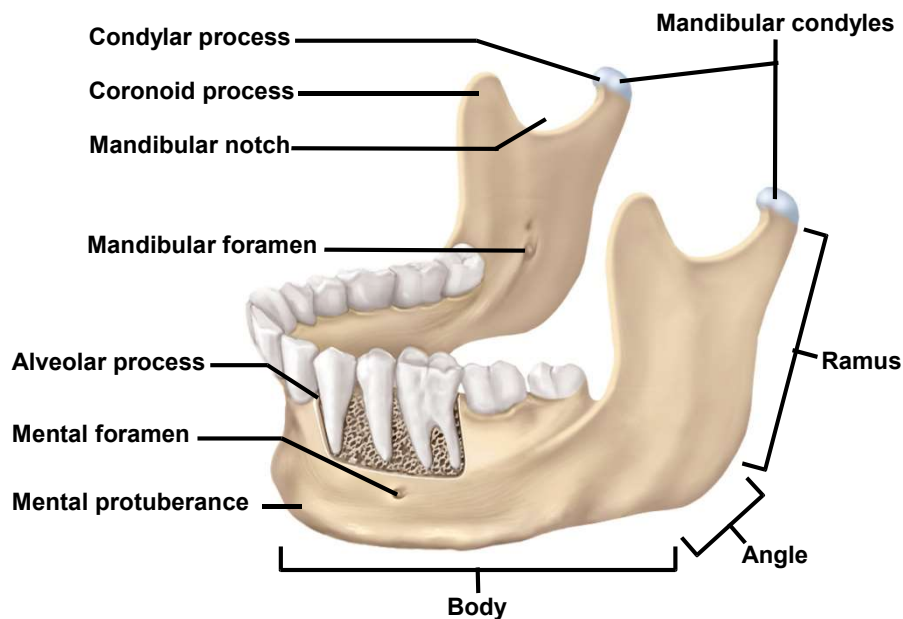
- inferior half of the nasal septum
 - superior half formed by perpendicular plate of ethmoid
- supports cartilage that forms the anterior part of the nasal septum

Mandible

- strongest bone of the skull
- only bone of skull that moves noticeably
- supports lower teeth
- provides attachments for muscles of facial expression and mastication
- **mental symphysis** – median cartilaginous joint in fetus
 - develops as two separate bones in fetus
 - ossifies in early childhood
- **mental protuberance** – point of chin
- two major parts on each side
 - **body** – supports teeth
 - **ramus** – articulates with cranium
 - **angle** – where body and ramus meet
- **alveolar processes** between teeth
- **mental foramen**
- **mental spines**



Ramus, Angle and Body of Mandible



- condylar process bears the mandibular condyle – oval knob that articulates with the mandibular fossa of the temporal bone forming the hinge temporomandibular joint (TMJ)
- coronoid process – point of insertion of temporalis muscle
- mandibular notch
- mandibular foramen

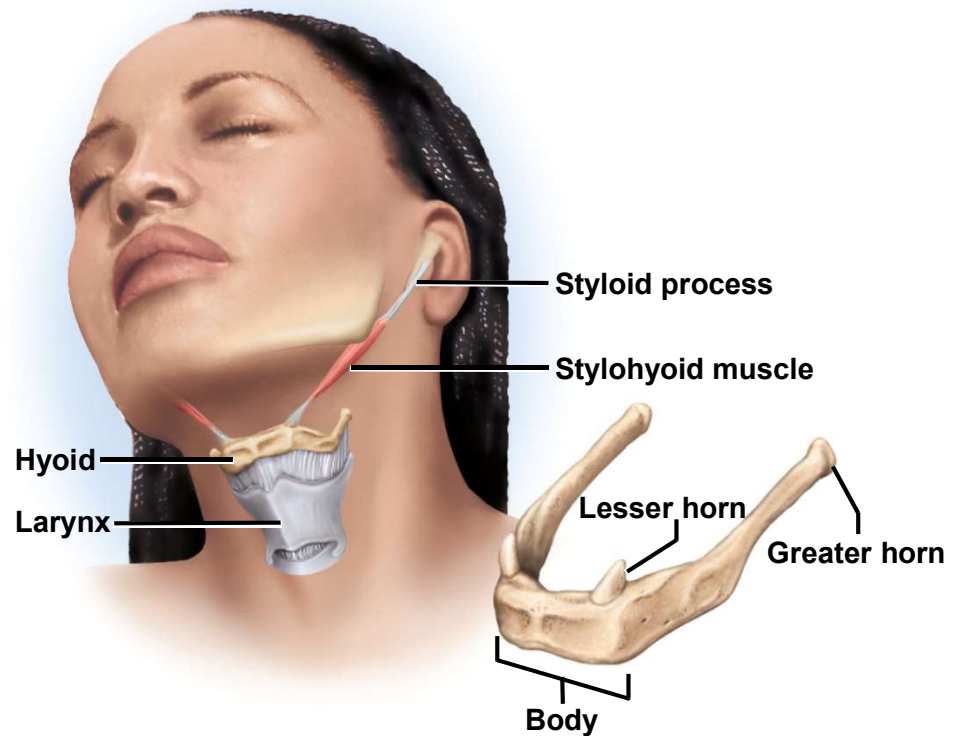
Bones Associated With Skull

- **auditory ossicles**

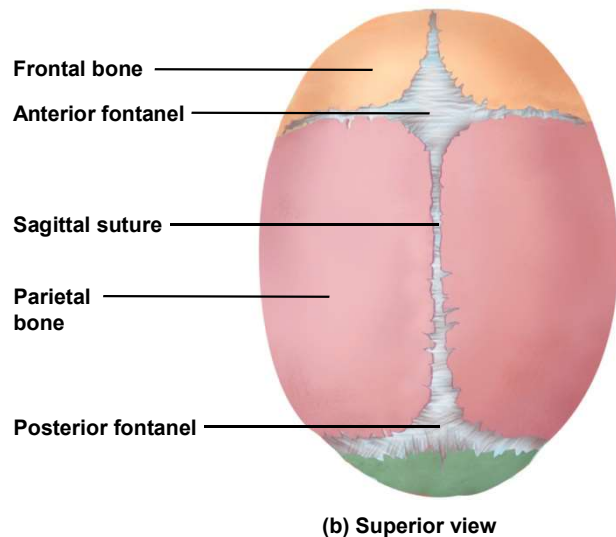
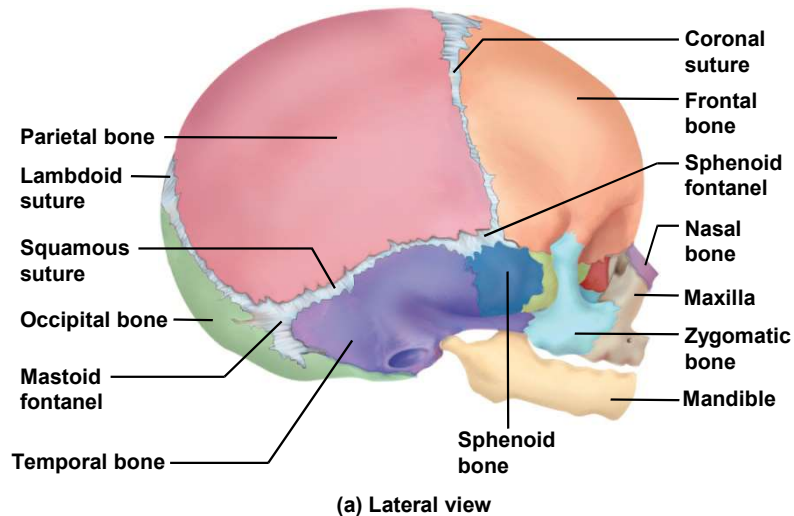
- three in each middle-ear cavity
- **malleus, incus, and stapes**

- **hyoid bone**

- slender u-shaped bone between the chin and larynx
- does not articulate with any other bone
- suspended from styloid process of skull by muscle and ligament
- **body and greater and lesser horns (cornua)**
- fractured hyoid bone is evidence of strangulation



Skull in Infancy and Childhood



- **fontanelles** - spaces between unfused bones
 - filled with fibrous membrane
 - allow shifting of bones during birth and growth of brain
 - **anterior, posterior, sphenoid** (anterolateral), and **mastoid** (posterolateral **fontanelles**)
- two frontal bones fuse by age 6 (**metopic suture**)
- skull reaches adult size by 8 or 9 years of age