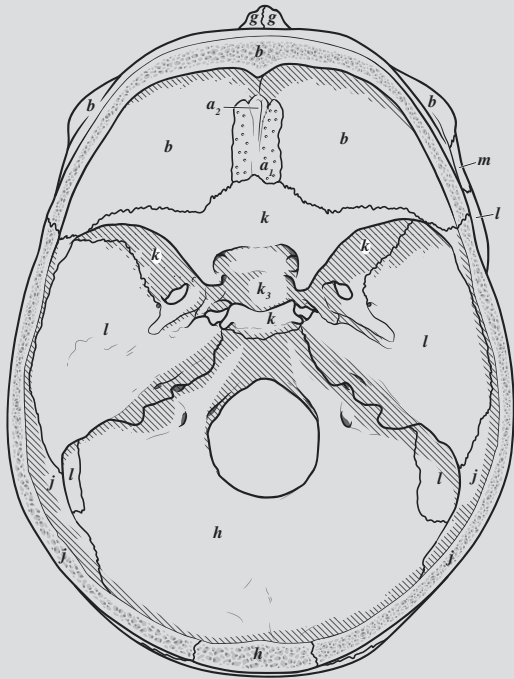


## ACTIVITY



# 3

## AXIAL SKELETON

### OBJECTIVES

- How to get ready:** Read CHAPTER 7, MCKINLEY ET AL., *HUMAN ANATOMY*, 2024 RELEASE. All text references are for this textbook. Learning the meanings of the **bone markings** and features is very helpful. There are tables provided in your text and at the end of this activity for understanding the meanings of common bone markings. Refer to these as you are studying bone anatomy.
- Identify the **cranial and facial bones** and important **bone markings** on each.
- Identify the types of vertebrae and other features of the vertebral column and important bone markings on each.
- Identify the ribs and sternum and important bone markings on each.
- Before next class:** Preview Appendicular Skeleton terms lists from SLCC Anatomy Laboratory website or your printed laboratory manual and your textbook.

# Activity 3

## Axial Skeleton Bones and Features

TABLE 3-1. Sinuses, Sutures, and Fontanelles	
STRUCTURES TO IDENTIFY	TEXT REFERENCES
<p><b>SUTURES</b>—Know which bones are joined by each major suture, and be able to identify these from any view.</p>	FIG. 7.5, 7.6
<input type="checkbox"/> coronal suture	
<input type="checkbox"/> sagittal suture	
<input type="checkbox"/> squamous suture	
<input type="checkbox"/> lambdoid suture	
<p><b>PARANASAL SINUSES</b>—Air-filled chambers named for the bone in which they are housed. They can be identified in different sections of the skull.</p>	FIG. 7.3; FIG. 7.24
<input type="checkbox"/> frontal sinus	
<input type="checkbox"/> ethmoidal sinus	
<input type="checkbox"/> sphenoidal sinus	
<input type="checkbox"/> maxillary sinus	
<p><b>FONTANELLES</b>—Features (soft spots) of the fetal skull.</p>	FIG. 7.27
<input type="checkbox"/> anterior/frontal fontanelle	
<input type="checkbox"/> sphenoidal fontanelle	
<input type="checkbox"/> mastoid fontanelle	
<input type="checkbox"/> posterior fontanelle	

TABLE 3-2. Cranial and facial bones: You are responsible for <b>determining left or right</b> on all paired cranial and facial bones. Paired bones are indicated by (2) in parentheses.			
BONE	BONE MARKINGS	SIGNIFICANCE/NOTES	TEXT REFERENCES
<input type="checkbox"/> <b>frontal</b>	<input type="checkbox"/> supraorbital foramen (notch)		FIG 7.4, 7.10
	<input type="checkbox"/> frontal sinus	<input type="checkbox"/> moistens air	
<input type="checkbox"/> <b>parietal (2)</b>			
<input type="checkbox"/> <b>nasal (2)</b>			FIG. 7.4

## Axial Skeleton

**TABLE 3-2. Cranial and facial bones:** *You are responsible for determining left or right on all paired cranial and facial bones. Paired bones are indicated by (2) in parentheses.*

BONE	BONE MARKINGS	SIGNIFICANCE/NOTES	TEXT REFERENCES
□ <b>sphenoid</b>	□ greater wing		<b>CHAPTER 7, MULTIPLE FIGURES</b>
	□ lesser wing		
	□ sella turcica	houses pituitary gland	
	□ optic foramen/canal	CNII (optic nerve)	
	□ foramen ovale	CNV	
	□ foramen rotundum	CNV	
	□ foramen spinosum		
	□ foramen lacerum	foramen formed between occipital, sphenoid, and temporal bones	
	□ superior orbital fissure		
	□ inferior orbital fissure	CNV, CNIII, CNIV, CNV, CNVI foramen formed between maxilla, sphenoid, and zygomatic bones	<b>FIG. 7.4</b>
□ sphenoidal sinus	moistens air		
□ pterygoid processes			
□ lateral and medial plates			
□ <b>ethmoid</b>	□ perpendicular plate	superior part of nasal septum	<b>FIG. 7.9, 7.16</b>
	□ superior & middle nasal concha	increase surface area for warming and filtering air	
	□ cribriform plate	cribriform foramina in cribriform plate are passageways for olfactory nerves	
	□ crista galli	attachment site for dura mater to skull	
□ <b>inferior nasal concha (2)</b>		increase surface area for warming and filtering air	<b>FIG. 7.4</b>
□ <b>lacrimal (2)</b>	□ lacrimal groove (nasolacrimal canal)	passageway for nasolacrimal duct	<b>FIG. 7.6</b>
□ <b>zygomatic (2)</b>	□ temporal process	form anterior portion of <b>zygomatic arch</b>	<b>FIG. 7.6, 7.18</b>

# Activity 3

**TABLE 3-2. Cranial and facial bones:** *You are responsible for determining left or right on all paired cranial and facial bones. Paired bones are indicated by (2) in parentheses.*

BONE	BONE MARKINGS	SIGNIFICANCE/NOTES	TEXT REFERENCES
□ <b>maxilla (2)</b>	□ infraorbital foramen	CNV	<b>FIG. 7.4, 7.6, 7.7, 7.8, 7.21</b>
	□ alveolar processes	contain upper teeth	
	□ palatine process	form anterior portion of hard palate	
	□ incisive foramen (fossa)	branch from CNV foramen formed at the junction between left and right maxilla	
□ <b>mandible</b>	□ body		<b>FIG. 7.4, 7.6, 7.22</b>
	□ ramus		
	□ alveolar processes	contain lower teeth	
	□ angle		
	□ mental foramen	CNV (mandibular branch); blood vessels	
	□ coronoid process	insertion point of temporalis and masseter muscle	
	□ mandibular condyle □ condylar process □ head	forms joint with mandibular fossa of temporal bone	
□ mandibular notch			
□ <b>temporal (2)</b>	□ zygomatic process	forms posterior portion of <b>zygomatic arch</b>	<b>FIG. 7.4-7.9, 7.12</b>
	□ squamous region	squamous = flat	
	□ styloid process	attachment for hyoid bone and tongue muscles	
	□ mastoid process	insertion for sternocleidomastoid muscle	
	□ external acoustic/auditory meatus	opening to the auditory canal	
	□ petrous part	houses inner ear structures	
	□ jugular foramen	internal jugular vein; CNIX, CNX, CNXI foramen formed between temporal and occipital bones	
	□ carotid canal	internal carotid artery	
	□ mandibular fossa	forms joint with mandibular condyle	
□ internal acoustic meatus	CNVII, CNVIII, and blood vessels to inner ear		

## Axial Skeleton

**TABLE 3-2. Cranial and facial bones:** *You are responsible for determining left or right on all paired cranial and facial bones. Paired bones are indicated by (2) in parentheses.*

BONE	BONE MARKINGS	SIGNIFICANCE/NOTES	TEXT REFERENCES
□ <b>occipital</b>	□ foramen magnum	spinal cord; vertebral arteries; CNXI	<b>FIG. 7.5-7.9, 7.13</b>
	□ hypoglossal canal	CNXII (hypoglossal nerve)	
	□ external occipital protuberance and crest	attachment site for neck/back muscles	
	□ occipital condyles	articulates with atlas (C1 vertebra)	
□ <b>palatine (2)</b>	□ horizontal plate	form posterior portion of hard palate	<b>FIG. 7.7, 7.8, 7.20</b>
□ <b>vomer</b>		forms inferior part of nasal septum	<b>FIG. 7.7, 7.8, 7.19</b>
□ <b>hyoid</b> (not a cranial or facial bone)		articulates with no other bones; supports tongue and soft tissue	<b>FIG. 7.26</b>

## Axial Skeleton

**TABLE 3-3. Vertebrae:** Most of the 32 vertebrae have the following features to identify: *lamina, pedicle, transverse process, articular processes, vertebral foramen, body, intervertebral foramen.*

BONE NAME	# BONES	BONE MARKING	DESCRIPTION & RELATED STRUCTURES OF IMPORTANCE
<b>FIG. 7.28, 7.29, TABLE 7.5</b>			
<b>typical vertebra</b> (pl. <i>vertebrae</i> )	<b>32 total</b>	<input type="checkbox"/> lamina	connects transverse to spinous process
		<input type="checkbox"/> pedicle	connects body to transverse process
		<input type="checkbox"/> transverse process	process directed laterally
		<input type="checkbox"/> spinous process	process directed posteriorly
		<input type="checkbox"/> articular processes and facets (superior and inferior)	form joints between adjacent vertebrae
		<input type="checkbox"/> vertebral foramen	contains spinal cord
		<input type="checkbox"/> body	largest part of the vertebra
		<input type="checkbox"/> intervertebral disc (not a bone)	fibrocartilage found between adjacent vertebral bodies
<input type="checkbox"/> intervertebral foramen	between any two vertebrae, contains spinal nerves		
<input type="checkbox"/> <b>cervical vertebra</b>	<b>7</b>	<input type="checkbox"/> transverse foramen	contains vertebral artery and vein
<input type="checkbox"/> atlas (C1)			C1 has no body
<input type="checkbox"/> axis (C2)		<input type="checkbox"/> odontoid process (dens)	dens articulates with C1
<input type="checkbox"/> vertebra prominens (C7)		<input type="checkbox"/> spinous process	very large, easily felt under the skin
<input type="checkbox"/> <b>thoracic vertebra</b>	<b>12</b>	<input type="checkbox"/> costal facet	transverse process contains facets for articulation of the angle of a rib
<input type="checkbox"/> <b>lumbar vertebra</b>	<b>5</b>		
<b>FIG. 7.31</b>			
<input type="checkbox"/> <b>sacrum</b>	<b>5 (fused)</b>	<input type="checkbox"/> anterior sacral foramina	contain ventral rami of sacral spinal nerves
		<input type="checkbox"/> posterior sacral foramina	contain dorsal rami of sacral spinal nerves
		<input type="checkbox"/> median sacral crest	represents fused spinous processes of sacral vertebrae
		<input type="checkbox"/> auricular surfaces	ear-like process, articulates with the auricular surface of the ilium
		<input type="checkbox"/> superior articular processes	articulate with inferior articular processes of L5
<input type="checkbox"/> <b>coccyx</b>	<b>2 to 3 (fused)</b>	<input type="checkbox"/> cornu (horns)	small horns that point superiorly

## Axial Skeleton

TABLE 3-4. Sternum and ribs		
BONE	BONE MARKING	TEXT REFERENCES
<b>□ STERNUM</b>		
□ manubrium	□ sternal (jugular) notch	<b>FIG. 7.32</b>
	□ sternal angle	
	□ clavicular notch	
	□ costal notches	
□ body	□ costal notches	
□ xiphoid process		
<b>□ RIBS</b>		
□ true ribs (1-7)	□ head ( <i>capitulum</i> ) of rib	<b>FIG. 7.33</b>
	□ neck of rib	
	□ tubercle of rib	
	□ angle	
	□ costal groove	
	□ shaft (body)	
□ false ribs (8-12)	□ no direct contact with sternum	
□ floating ribs (11-12)	□ no contact with sternum	

# Activity 3

## STUDY AIDS FOR SKELETAL SYSTEM

**Understanding the meaning of each bone marking is very helpful in learning the landmarks of individual bones.** These tables are provided as a study resource, and you won't be tested on the descriptions of these terms.

Helpful bone marking terms used in Axial Skeleton

ANATOMICAL TERMS	DESCRIPTION
<b>auricular (auricle)</b>	ear
<b>axis</b>	the central line of a body or part, where rotation takes place
<b>carotid</b>	to put to sleep
<b>coronoid</b>	shaped like a crown
<b>costal</b>	rib
<b>crista galli</b>	crest of a rooster
<b>cribriform</b>	sieve-like
<b>concha</b>	shell
<b>hypoglossal</b>	under the tongue
<b>jugular</b>	neck
<b>lacrimal</b>	a tear (drop)
<b>magnum</b>	great
<b>manubrium</b>	handle
<b>mastoid</b>	shaped like breast
<b>mental</b>	chin
<b>odontoid</b>	tooth-like
<b>orbit</b>	circle, bony socket for the eyeball
<b>prominens</b>	projecting
<b>petrous</b>	rocky
<b>pterygoid</b>	wing-shaped
<b>sacrum</b>	sacred or strong bone
<b>sella turcica</b>	Turkish saddle
<b>sphenoid</b>	wedge-shaped
<b>squamous</b>	scale-like
<b>sternum</b>	chest
<b>styloid</b>	pencil-like structure
<b>xiphoid</b>	sword-shaped



## Axial Skeleton

Helpful bone marking terms used in both Axial and Appendicular Skeleton

ANATOMICAL TERMS	DESCRIPTION
<b>alveolus</b> (pl., <i>alveoli</i> )	deep pit or socket
<b>canal</b>	a “water-pipe”, passageway through a bone
<b>condyle</b>	large articulating rounded structure, knuckle
<b>crest</b>	prominent ridge-like projection
<b>epicondyle</b>	adjacent projection to a condyle
<b>facet</b>	small, smooth and shallow articulating surface
<b>fissure</b>	cleft; narrow, slit-like opening through a bone
<b>foramen</b> (pl., <i>foramina</i> )	rounded passage through a bone, a hole
<b>fossa</b>	shallow depression, a concavity within a surface
<b>head</b>	prominent and rounded epiphysis
<b>line</b>	low ridge
<b>linea</b>	line
<b>notch</b>	an indentation
<b>process</b>	going forward, outgrowth in a bone
<b>protuberance</b>	a bulging bone feature
<b>ramus</b> (pl., <i>rami</i> )	branch
<b>sinus</b>	hollow space in a bone
<b>spine</b>	a thorn, sharp or pointed slender process
<b>sulcus</b>	groove
<b>trochanter</b>	a runner, massive projection only found in femur
<b>trochlea</b>	a pulley
<b>tubercle</b>	small prominence, small rounded projection
<b>tuberosity</b>	large, rough projection