

ACTIVITY

3

AXIAL SKELETON

OBJECTIVES

1. **How to get ready:** Read CHAPTER 7, MCKINLEY ET AL., *HUMAN ANATOMY*, 5E. 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.
2. Identify the **cranial and facial bones** and important **bone markings** on each.
3. Identify the types of vertebrae and other features of the vertebral column and important bone markings on each.
4. Identify the ribs and sternum and important bone markings on each.
5. **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

STRUCTURES TO IDENTIFY	TEXT REFERENCES
<p>SUTURES—Know which bones are joined by each major suture, and be able to identify these from any view.</p> <p><input type="checkbox"/> coronal suture</p> <p><input type="checkbox"/> sagittal suture</p> <p><input type="checkbox"/> squamous suture</p> <p><input type="checkbox"/> lambdoid suture</p>	<p>FIG. 7.5, 7.6, P. 179–180; DESCRIBED: P. 185</p>
<p>PARANASAL SINUSES—Air-filled chambers named for the bone in which they are housed. They can be identified in different sections of the skull.</p> <p><input type="checkbox"/> frontal sinus</p> <p><input type="checkbox"/> ethmoidal sinus</p> <p><input type="checkbox"/> sphenoidal sinus</p> <p><input type="checkbox"/> maxillary sinus</p>	<p>FIG. 7.3; P. 176, FIG. 7.24; P. 200</p>
<p>FONTANELLES—Features (soft spots) of the fetal skull.</p> <p><input type="checkbox"/> anterior/frontal fontanelle</p> <p><input type="checkbox"/> sphenoidal fontanelle</p> <p><input type="checkbox"/> mastoid fontanelle</p> <p><input type="checkbox"/> posterior fontanelle</p>	<p>FIG. 7.27; P. 203</p>

TABLE 3-1. 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	TEXT REFERENCES
<input type="checkbox"/> frontal	<input type="checkbox"/> supraorbital foramen (notch)		PP. 176, 178
	<input type="checkbox"/> frontal sinus	<input type="checkbox"/> moistens air	
<input type="checkbox"/> parietal (2)			
<input type="checkbox"/> nasal (2)			PP. 176, 178

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TABLE 3-1. 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	TEXT REFERENCES
<input type="checkbox"/> sphenoid	<input type="checkbox"/> greater wing		PP. 182, 184, 190–191
	<input type="checkbox"/> lesser wing		
	<input type="checkbox"/> sella turcica	houses pituitary gland	
	<input type="checkbox"/> optic foramen/canal	CNII (optic nerve)	
	<input type="checkbox"/> foramen ovale	CNV	
	<input type="checkbox"/> foramen rotundum	CNV	
	<input type="checkbox"/> foramen spinosum		
	<input type="checkbox"/> foramen lacerum ¹		
	<input type="checkbox"/> superior orbital fissure	CNIII, CNIV, CNV, CNVI	
	<input type="checkbox"/> inferior orbital fissure ²	CNV	
	<input type="checkbox"/> sphenoidal sinus	moistens air	P. 181
	<input type="checkbox"/> pterygoid processes		
	<input type="checkbox"/> lateral and medial plates		
<input type="checkbox"/> ethmoid	<input type="checkbox"/> perpendicular plate	superior part of nasal septum	PP. 184, 193
	<input type="checkbox"/> superior & middle nasal concha	increase surface area for warming and filtering air	
	<input type="checkbox"/> cribriform plate (and foramina)	passageway for olfactory nerves	
	<input type="checkbox"/> crista galli	attachment site for dura mater to skull	
<input type="checkbox"/> inferior nasal concha (2)		increase surface area for warming and filtering air	P. 178
<input type="checkbox"/> lacrimal (2)	<input type="checkbox"/> lacrimal groove (nasolacrimal canal)	passageway for nasolacrimal duct	P. 180
<input type="checkbox"/> zygomatic (2)	<input type="checkbox"/> temporal process	form anterior portion of zygomatic arch	P. 180
<input type="checkbox"/> maxilla (2)	<input type="checkbox"/> infraorbital foramen	CNV	PP. 178, 180, 197
	<input type="checkbox"/> alveolar processes	contain upper teeth	
	<input type="checkbox"/> palatine process	form anterior portion of hard palate	
	<input type="checkbox"/> incisive foramen (fossa) ³	branch from CNV	

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TABLE 3-1. 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	TEXT REFERENCES
<input type="checkbox"/> mandible	<input type="checkbox"/> body		PP. 178, 180, 198
	<input type="checkbox"/> ramus		
	<input type="checkbox"/> alveolar processes	contain lower teeth	
	<input type="checkbox"/> angle		
	<input type="checkbox"/> mental foramen	CNV (mandibular branch); blood vessels	
	<input type="checkbox"/> coronoid process	insertion point of temporalis muscle	
	<input type="checkbox"/> mandibular condyle and condylar process	forms joint with mandibular fossa of temporal bone	
	<input type="checkbox"/> mandibular notch		
<input type="checkbox"/> temporal (2)	<input type="checkbox"/> zygomatic process	forms posterior portion of zygomatic arch	PP. 180–181, 188
	<input type="checkbox"/> squamous region	squamous = flat	
	<input type="checkbox"/> styloid process	attachment for hyoid bone and tongue muscles	
	<input type="checkbox"/> mastoid process	insertion for sternocleidomastoid muscle	
	<input type="checkbox"/> external acoustic/auditory meatus	opening to the auditory canal	
	<input type="checkbox"/> petrous part	houses inner ear structures	
	<input type="checkbox"/> jugular foramen ⁴	internal jugular vein; CNIX, CNX, CNXI	
	<input type="checkbox"/> carotid canal	internal carotid artery	
	<input type="checkbox"/> mandibular fossa	forms joint with mandibular condyle	
	<input type="checkbox"/> internal acoustic meatus	CNVII, CNVIII, and blood vessels to inner ear	

Axial Skeleton

TABLE 3-1. 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	TEXT REFERENCES
<input type="checkbox"/> occipital	<input type="checkbox"/> foramen magnum	spinal cord; vertebral arteries; CNXI	PP. 179, 182, 184, 189
	<input type="checkbox"/> hypoglossal canal	CNXII (hypoglossal nerve)	
	<input type="checkbox"/> external occipital protuberance and crest	attachment site for neck/back muscles	
	<input type="checkbox"/> occipital condyles	articulates with atlas (C1 vertebra)	
<input type="checkbox"/> palatine (2)	<input type="checkbox"/> horizontal plate	form posterior portion of hard palate	PP. 181–182, 192, 196
<input type="checkbox"/> vomer		forms inferior part of nasal septum	PP. 178, 181–182, 195
<input type="checkbox"/> hyoid	<input type="checkbox"/> not a cranial or facial bone	articulates with no other bones; supports tongue and soft tissue	P. 201

1. Between occipital, sphenoid, and temporal bones
2. Between maxilla, sphenoid, and zygomatic bones
3. Between two maxilla
4. Between temporal and occipital bones

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TABLE 3-2. 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
PP. 205–210, FIG. 7.28, 7.29, TABLE 7.5			
typical vertebra (pl. <i>vertebrae</i>)	32 total	<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"/> cervical vertebra	7	<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"/> thoracic vertebra	12	<input type="checkbox"/> costal facet	transverse process contains facets for articulation of the angle of a rib
<input type="checkbox"/> lumbar vertebra	5		
P. 211, FIG. 7.31			
<input type="checkbox"/> sacrum	5 (fused)	<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 ilium
		<input type="checkbox"/> superior articular processes	articulate with inferior articular processes of L5
<input type="checkbox"/> coccyx	2 to 3 (fused)	<input type="checkbox"/> cornu (horns)	small horns that point superiorly

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TABLE 3-3. Sternum and ribs		
BONE	BONY LANDMARK	TEXT REFERENCES
<input type="checkbox"/> STERNUM		
<input type="checkbox"/> manubrium	<input type="checkbox"/> sternal (jugular) notch	DESCRIBED: P. 212; FIG. 7.32
	<input type="checkbox"/> sternal angle	
	<input type="checkbox"/> clavicular notch	
	<input type="checkbox"/> costal notches	
<input type="checkbox"/> body	<input type="checkbox"/> costal notches	
<input type="checkbox"/> xiphoid process		
<input type="checkbox"/> RIBS		
<input type="checkbox"/> true ribs (1–7)	<input type="checkbox"/> head (<i>capitulum</i>) of rib	DESCRIBED: P. 213; FIG. 7.33
	<input type="checkbox"/> neck of rib	
	<input type="checkbox"/> tubercle of rib	
	<input type="checkbox"/> angle	
	<input type="checkbox"/> costal groove	
	<input type="checkbox"/> shaft (body)	
<input type="checkbox"/> false ribs (8–12)	<input type="checkbox"/> no direct contact with sternum	
<input type="checkbox"/> floating ribs (11–12)	<input type="checkbox"/> 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
auricular (auricle)	ear
axis	the central line of a body or part, where rotation takes place
carotid	to put to sleep
coronoid	shaped like a crown
costal	rib
crista galli	crest of a rooster
cribriform	sieve-like
concha	shell
hypoglossal	under the tongue
jugular	neck
lacrimal	a tear (drop)
magnum	great
manubrium	handle
mastoid	shaped like breast
mental	chin
odontoid	tooth-like
orbit	circle, bony socket for the eyeball
prominens	projecting
petrous	rocky
pterygoid	wing-shaped
sacrum	sacred or strong bone
sella turcica	Turkish saddle
sphenoid	wedge-shaped
squamous	scale-like
sternum	chest
styloid	pencil-like structure
xiphoid	sword-shaped

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Helpful bone marking terms used in both Axial and Appendicular Skeleton

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