Appendicular Skeleton

INTRODUCTION
The appendicular skeleton consists of bones of the arms, legs, and the bones that anchor the arms and legs to the axial skeleton. Specifically, the appendicular skeleton is composed of the following bones:

1. **Upper limbs**: bones in the arms and hands.
2. **Pectoral girdle**: formed by the scapula and the clavicle.
3. **Lower limbs**: bones in the legs and feet.
4. **Pelvic girdle**: formed by 2 coxae. **NOTE**: the sacrum, coccyx, and coxae together make up what is known as the **pelvis**.

See Ch 8 in your AP textbook for a list & number of bones in the appendicular skeleton.

**Upper Limb Bones**

The bones that make up each upper limb are: humerus, radius, ulna, eight carpals, five metacarpals, and fourteen phalanges.

**PART A  Bone in the Arm**
Figure 10.1  (a) Anterior view and (b) posterior view of the right humerus.

Name this bone: ________________

A. ________________

B. ________________

C. ________________

D. ________________

E. (fossa) ________________

F. (fossa) ________________
1. The head of the humerus fits into the __________________________ of scapula.

2. Why the surgical neck of the humerus is called like that? ______________________

3. Name the muscle that attaches to the deltoïd tuberosity of the humerus: __________
   What occurs to when this muscle contracts?

5. The olecranon fossa receives the __________________________when the elbow straightens.

PART B Bones in the Forearm
Figure 10.2 Label the (a) anterior parts of the right radius and ulna and (b) lateral view of the proximal end of the right ulna.

Hints: To recognize the ulna from the radius, the trochlear notch of the ulna looks like the letter “U” (and ulna begins with the letter “U”). Only the ulna has this “U” structure. Also, stand in the Anatomical Position: notice that the ulna is toward “U” (you!), toward the medial side of your body (the radius is to the outside or to the lateral side of your body).

More Hints: the radius will always be in line with the thumb!
Figure 10.4 Label the posterior parts of the right elbow.

A. (Bone) ___________________
B. _________________________
C. _________________________
D. _________________________
E. (Bone) ___________________
F. (Bone) ___________________

Figure 10.5 Label bones of the (a) anterior view & (b) posterior view of the right hand.

A. ____________________________
B. ____________________________
C. ____________________________
D. ____________________________
E. ____________________________
F. ____________________________
G. ____________________________
H. ____________________________

**Hint:** It does not matter how you turn your hand – the radius will always be in line with the thumb! *Try it and point to the radius when your hand is in different positions!*
The largest long bone of the upper extremities is…
  a) humerus   b) clavicle   c) ulna   d) radius

List the bones that make up the forearm: ________________________________

The large, proximal process of the ulna that forms the posterior “point” of the flexed elbow is…
  a) head       b) styloid process   c) olecranon  d) radial tuberosity

**PART C  Bones in the Hand**

*Figure 10.6 Label the bones in this anterior view of the right hand*

- A. ________________________________
- B. ________________________________
- C. ________________________________
- D. ________________________________
- E. ________________________________
- F. ________________________________
- G. ________________________________
- H. ________________________________
- I. ________________________________

**Remember:** the radius will always be in line with the thumb!

**Hint:** you use your thumb to turn on the radius (radio)!

**Phalanx = singular**

**Phalanges = plural**

The thumb lacks a middle phalanx.
Fig. 10.6a Label the carpal bones in the anterior view of the left hand.

Can you touch in your own wrist any carpal bones? Yes? Which ones?

Fig. 10.6b Label the carpal bones in the anterior and posterior view of the right hand

Label carpal bones on next page
What is the singular of metacarpals? ________________________________

What is the singular of carpals? ________________________________

How many phalanges are there in each thumb? ________________________________

How many phalanges are there in each finger? ________________________________

How many carpals bones are there in one hand? ______  In two hands? ________

Which phalanx is not present in the thumb? ________________________________

How many metacarpals are there in one hand? ______  In two hands? ________
PART D  X rays of the Upper Limb

Figure 10.7  Name the labeled bones in each X ray Picture.

(a) Name the broken bone: 

(b) 

(c) 

A. ________________
B. ________________
C. ________________
D. ________________
E. ________________
F. ________________
G. ________________

(a) 

(b) 

(c) 

D  

G
The pectoral girdle attaches the upper limbs to the axial skeleton. It consists of two clavicles and two scapulae.

**Figure 10.8 Anterior view of the right shoulder and upper limb.**

A. (bone)_______________________
B. __________________________
C. __________________________
D. __________________________
E. (bone)_______________________
F. (bone)_______________________
G. __________________________

**Figure 10.9 Lateral view of the right shoulder and upper limb.**

A. (bone)_______________________
B. __________________________
C. __________________________
D. __________________________
E. (bone)_______________________
F. (bone)_______________________

Scapula = singular
Scapulae = plural
1. The head of the humerus articulates with what bone? _________________________
2. The acromion process articulates with what? ______________________________
3. The media ends of the clavicles articulate with the ________________ of the sternum.
4. The ______________ is a bone that serves as a brace between the sternum & scapula.
5. The tip of shoulder is formed by the __________________________ of the scapula.
6. The glenoid cavity of the scapula articulates with the _____________ of the humerus.

Figure 10.10 (a) anterior view, (b) posterior view, and (c) lateral border view of the right scapula

A. __________________________________
B. _________________________________
C. __________________________________
D. __________________________________
E. __________________________________
F. __________________________________
G. __________________________________
H. __________________________________
I. __________________________________
J. __________________________________
K. __________________________________
L. __________________________________
M. __________________________________
N. __________________________________

Scapula = singular Scapulae = plural
**Explore on Your Own**

1. Touch the tip of your shoulder. You are actually touching the acromion process of the scapula!

2. Touch the spine of the scapula: You will need a partner to detect the spine of the scapula. Rub the tip to your fingers with gentle pressure on the posterior side of the scapula in your partner’s back. Try detecting the spine of both scapulae!

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**Lower Limb Bones**

The bones that make up each lower limb are: femur, patella, tibia, fibula, seven tarsals, five metatarsals, and fourteen phalanges.

**Figure 10.11** Anterior view of the right lower limb.
Figure 10.12 (a) anterior view, (b) posterior view of the right femur

A. ______________________   G. ______________________
B. ______________________   H. ______________________
C. ______________________  
D. ______________________
E. ______________________  
F. ______________________
1. The lateral and medial condyles articulate with the __________ of the leg.

2. The head of the femur articulates with the ______________________ of the coxa.

**Figure 10.13  Anterior view of the right tibia and fibula.**

A. (bone) ________________________
B. (bone) ________________________
C. ______________________________
D. ______________________________
E. (bone) _________________________
F. (bone) _________________________
G. ______________________________
H. ______________________________

1. Another name for the tibia is __________________________________________

2. Choose One: The tibia is located on the medial/lateral side of the leg.

3. Choose One: The fibula is located on the medial/lateral side of the leg.

4. The medial and lateral condyles of the tibia articulate with ______________________
Figure 10.14  Superior view of the right foot.

A. _______________________________
B. _______________________________
C. _______________________________
D. _______________________________
E. _______________________________
F. _______________________________

Phalanx = singular
Phalanges = plural

Tarsus = singular
Tarsals = plural

Metatarsus = singular
Metatarsals = plural

The big toe is missing the middle phalanx!

Figure 10.15  Medial view of the right foot.

A. _______________________________
B. _______________________________
C. _______________________________
D. _______________________________
Figure 10.15a  Superior (Dorsal) view of the right foot

A. _______________________
B. _______________________
C. _______________________
D. _______________________
E. _______________________
F. _______________________
G. _______________________

Distal group
Proximal group
Explore on Your Own
1. While seated, feel your kneecap—the patella—move as you flex and extend your lower leg. Just below the patella you should also be able to feel a ligament (the patellar ligament) that attaches it to your tibia.

2. Can you find the upper protuberance of your tibia? Move your fingers around to outside of the joint. Can you feel the knobby upper part of the fibula (the head of fibula)?

1. How many carpals are there in 1 hand? ______ in 2 hands? ______
2. How many phalanges are there in 1 hand? _____ in 2 hands? _____
3. How many metacarpals are there in 1 hand? _____ in 2 hands? _____
4. How many tarsals are there in 1 foot? ______ in 2 feet? ______
5. How many metatarsals are there in 1 foot? _____ in 2 feet? _____
6. How many phalanges are there in 1 foot? ______ in 2 feet? ______
7. How many TOTAL phalanges are there in the body? _________________
8. Name the largest tarsal bone. ________________________________

PART H  X rays of the Lower Limb
Figure 10.16  Name the labeled bones in each X ray picture.
The pelvic girdle attaches the lower limbs to the axial skeleton. It consists of the two coxae (“hipbones”). The coxae articulate with each other anteriorly at the symphysis pubis and posteriorly with the sacrum of the vertebral column. Note: the pelvis consists of the following three bones: coxae, sacrum, and coccyx.

Figure 10.17 (a) anterior and (b) posterior view of the pelvis

Coxa = singular     Coxae = plural

Note: the pelvis consists of: coxae, sacrum, and coccyx.

A. (bone)_______________________
B. (bone)_______________________
C. (bone)_______________________
D. ____________________________
E. ____________________________
F. ____________________________
G. ____________________________
H. (bone)_______________________
I. (bone)_______________________
J. _____________________________
K. ____________________________
L. ____________________________
M. ___________________________
1. The pelvic girdle consists of two ________________

2. The head of the femur articulates with the ________________ of the coxa.

3. Name the largest portion of the coxa. ______________________________________

4. The coxae come together anteriorly at the joint called __________________________

5. The __________ is the superior margin of the ilium that causes the prominence of the hip.

6. Name the largest foramen in the human skeleton. ________________________________
Male or Female Pelvic Girdle?

- male - heavier and thicker due to forces exerted by stronger muscles
- female - wider and shallower, and adapted to the needs of pregnancy and childbirth, larger pelvic inlet and outlet for passage of infant’s head

See Table 8-1 (Ch 8) for a list of sex differences in the human skeleton

Practice your knowledge in differentiating a male or a female pelvis
Describe the pubic arch in:

**Male pelvis**

**Female pelvis**

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**PRACTICE**
Identify the bones in this random arrangement using the terms provided below.

**Terms:** clavicle, coxa, hyoid, femur, fibula, humerus, patella, radius, ulna, sacrum, scapula, sternum, tibia.
Review Bones of the Axial and Appendicular Skeleton.

Figure 10.19  Label the major bones of skeleton

Anterior View
Figure 10.20  Label the major bones of skeleton