# Lab 1: Human Skeletal Morphology

## - Objectives -

- To learn the major bones of the human skeleton and other relevant anatomical terms

Introduction to the skeleton

At birth the human skeleton is made up of over 275 different bones. Some of these bones fuse together as the body matures, leaving only 206 bones in the adult body.

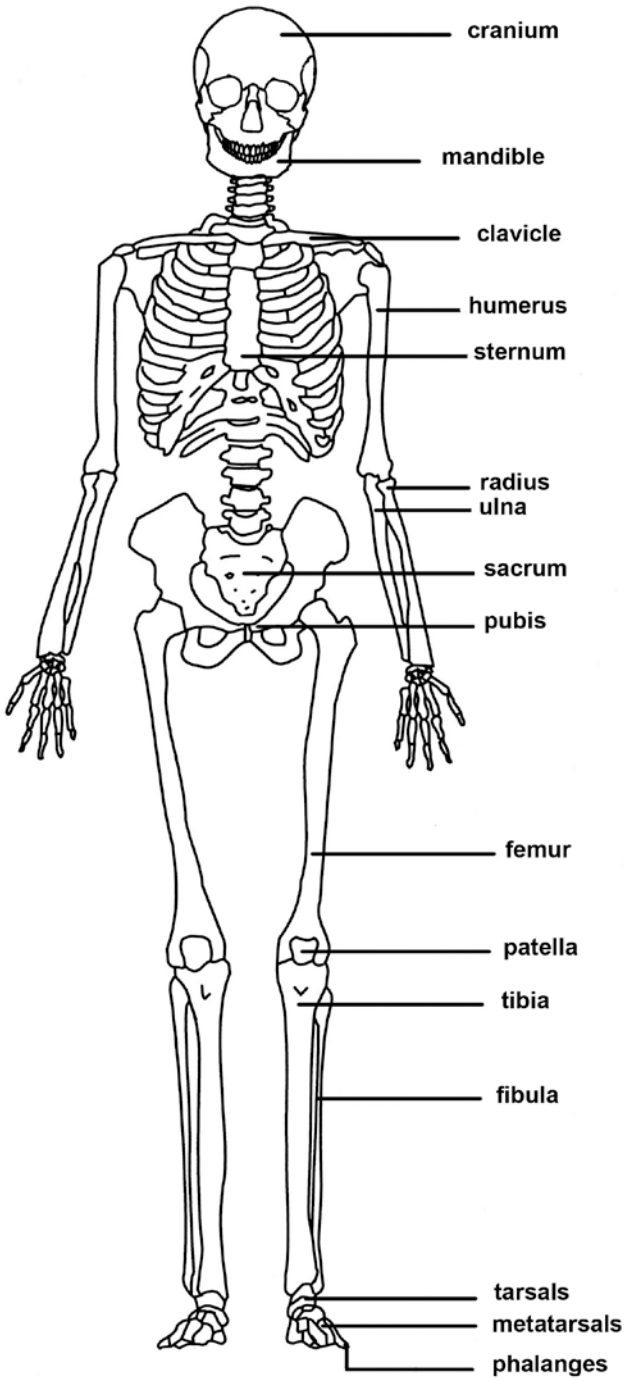
Bones are living structures with 5 functions:

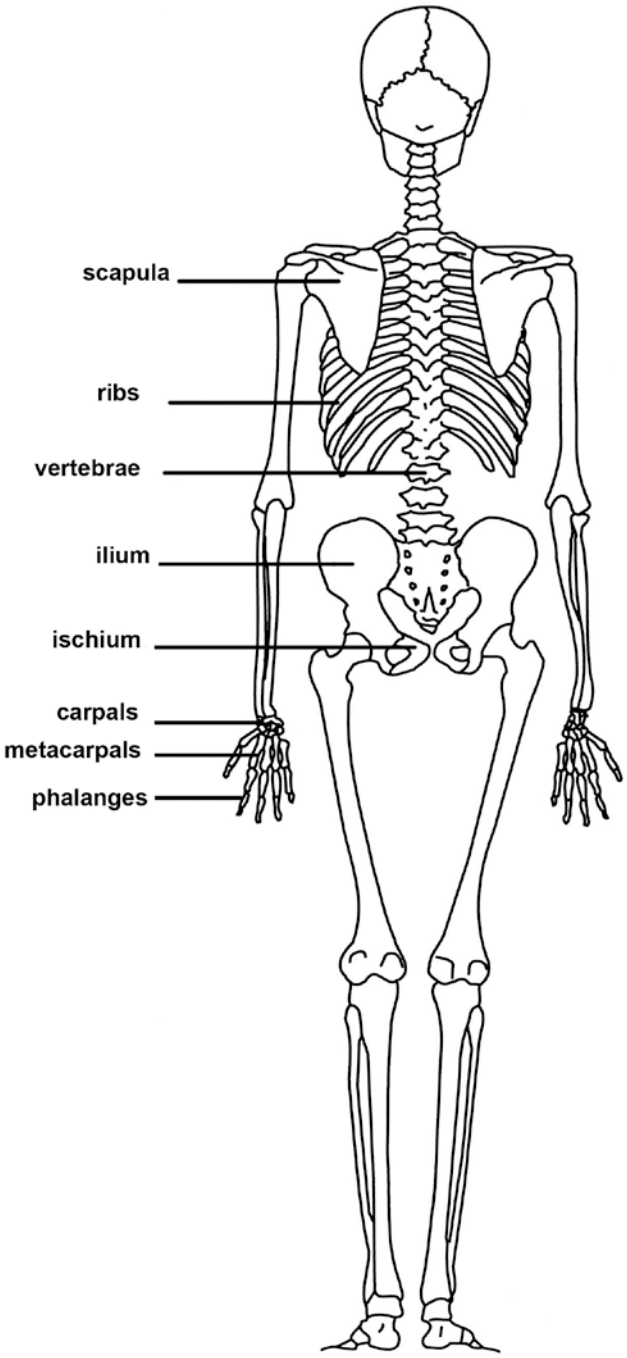
- protect internal organs
- support the body
- make blood cells
- store minerals
- provide sites for muscle attachment (allowing movement)

A point where two or more bones **articulate** (connect) is called a **joint**. There are two different types of joints in the body:

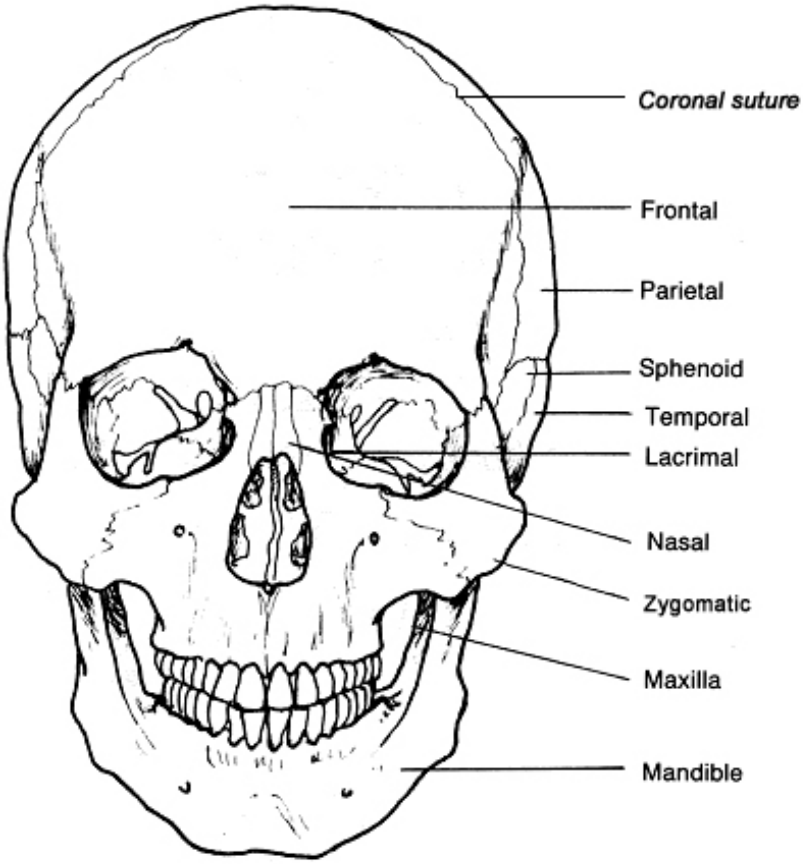
- **Movable joints** (like ball-and-socket, hinge, gliding, and pivot joints)
- **Immovable joints** (like the bones of the skull and pelvis) which allow little or no movement

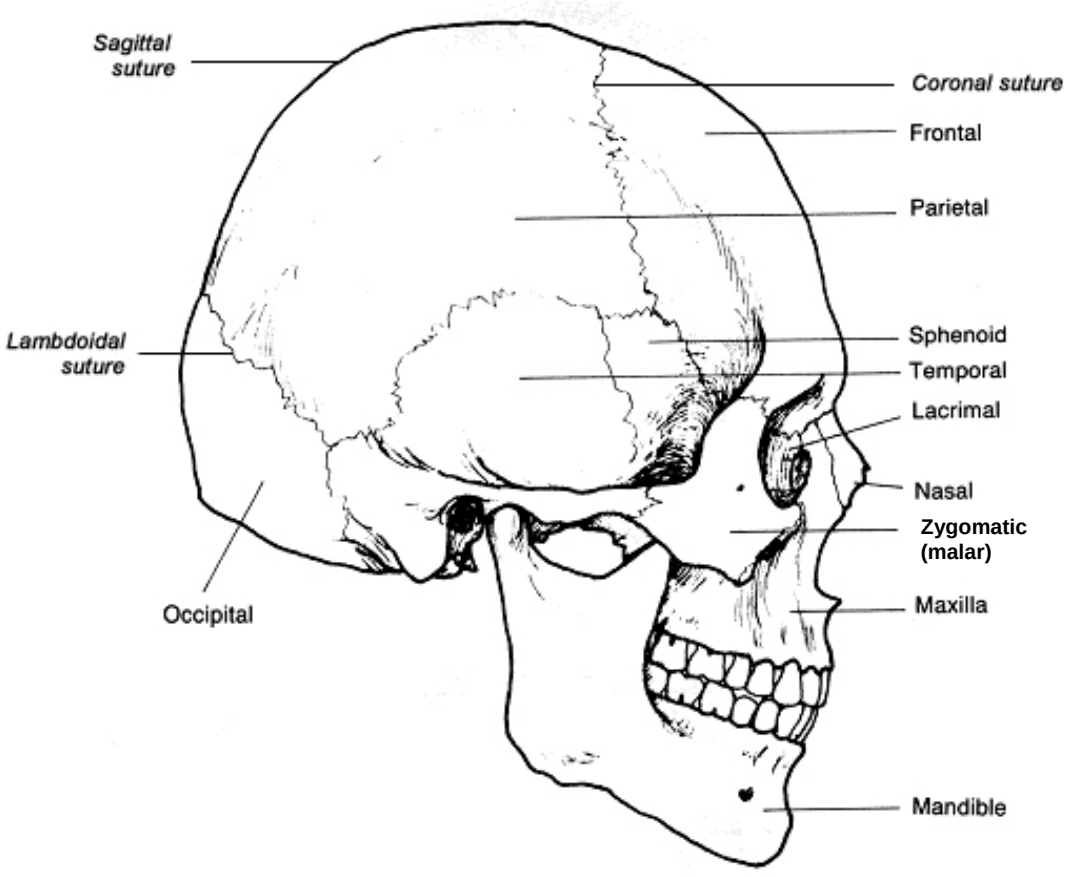
# The skeleton



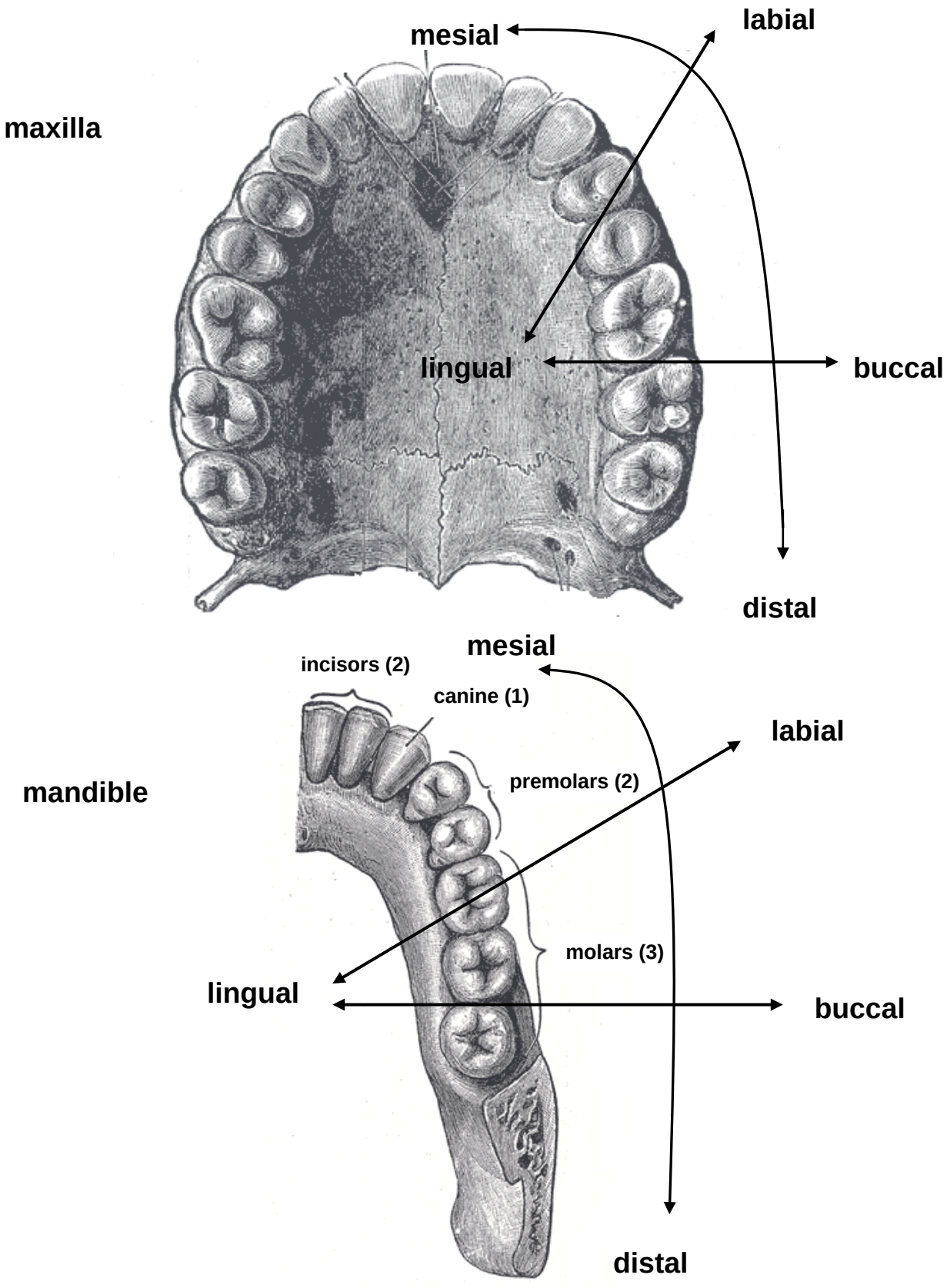



# The bones of the skull

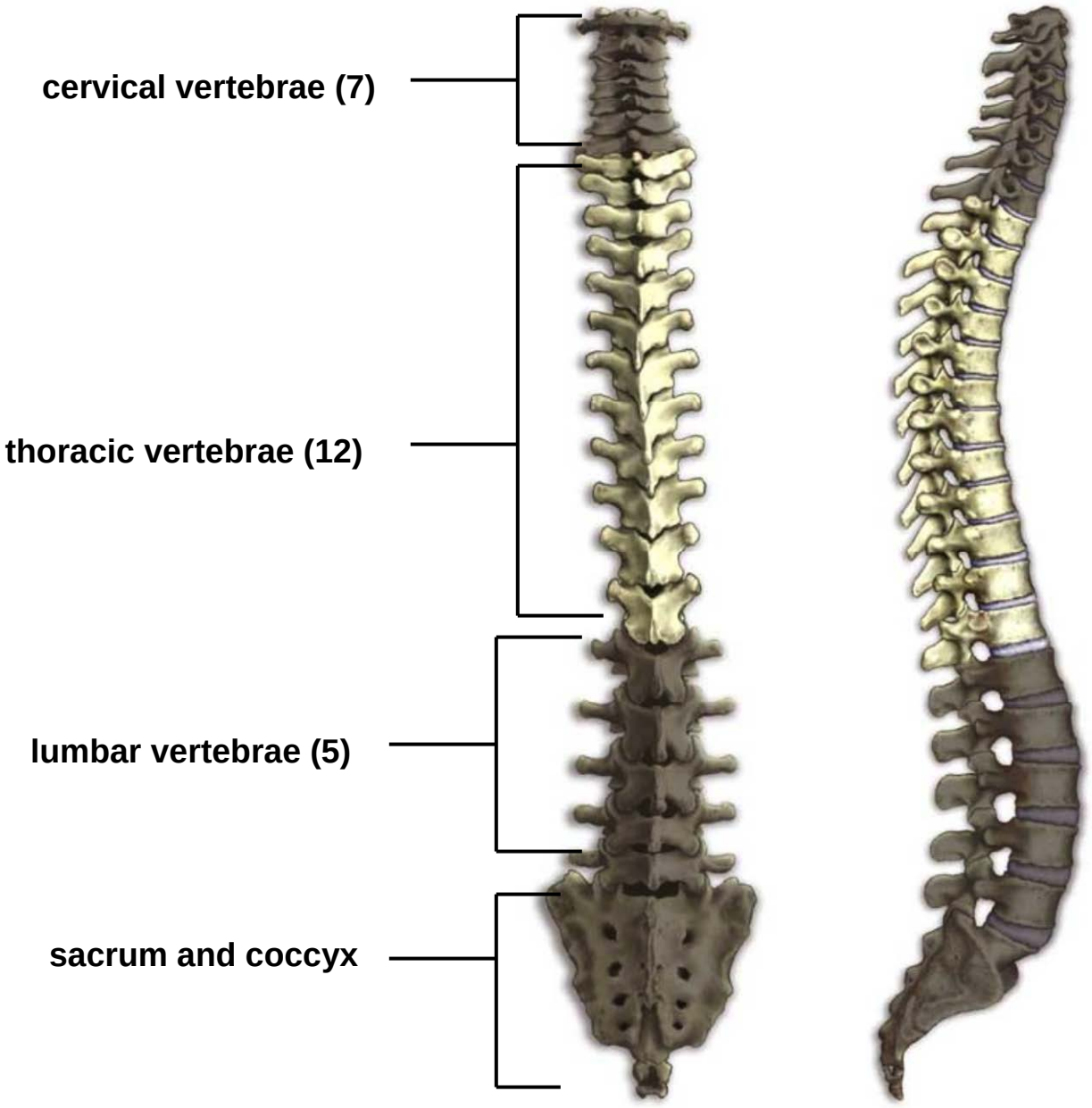


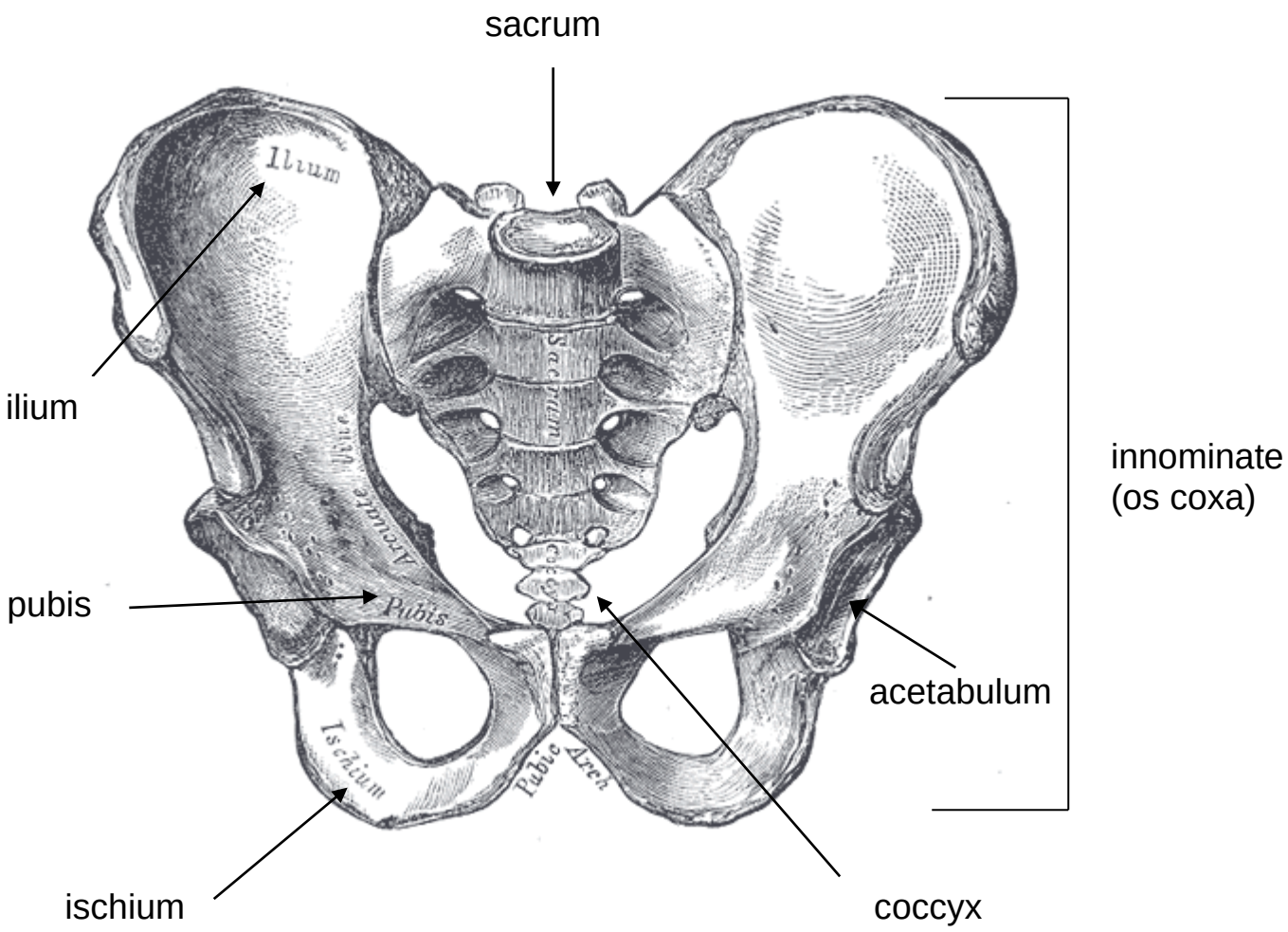
# Dentition


maxilla
mesial
labial
lingual
buccal
distal
mandible
mesial
incisors (2)
canine (1)
labial
premolars (2)
molars (3)
lingual
buccal
distal

# The vertebral column (spinal column)

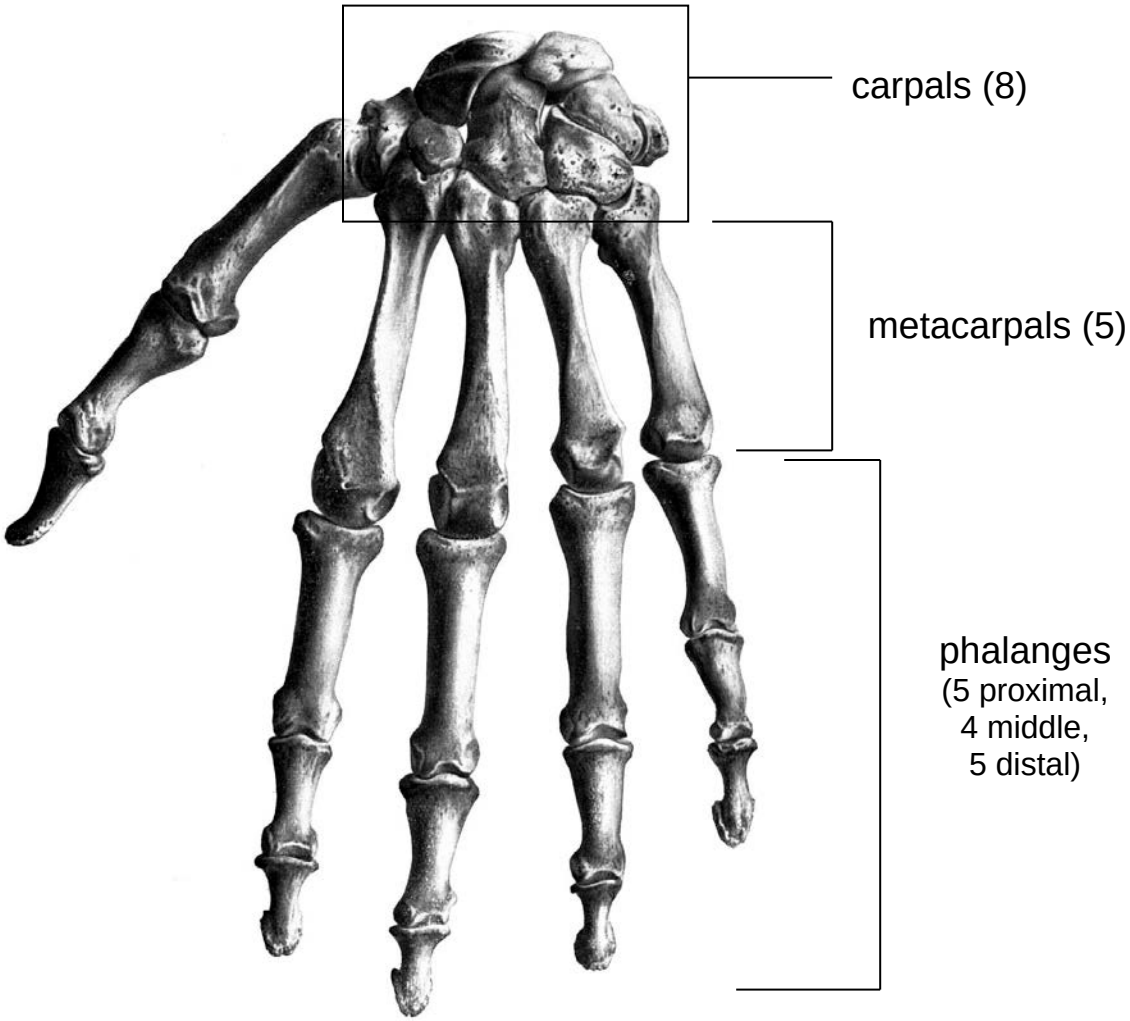


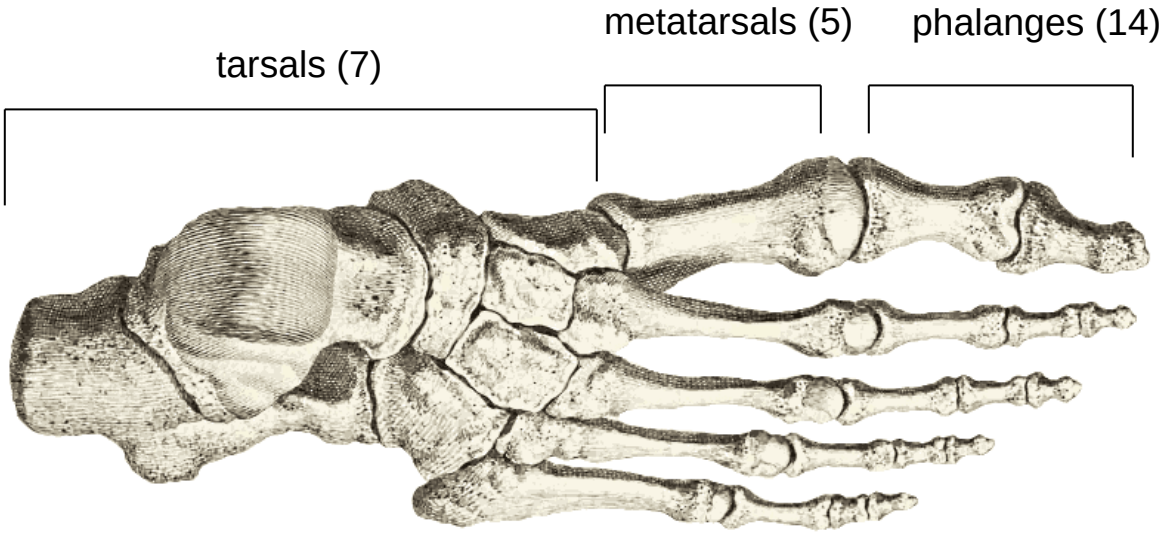
# The Pelvis



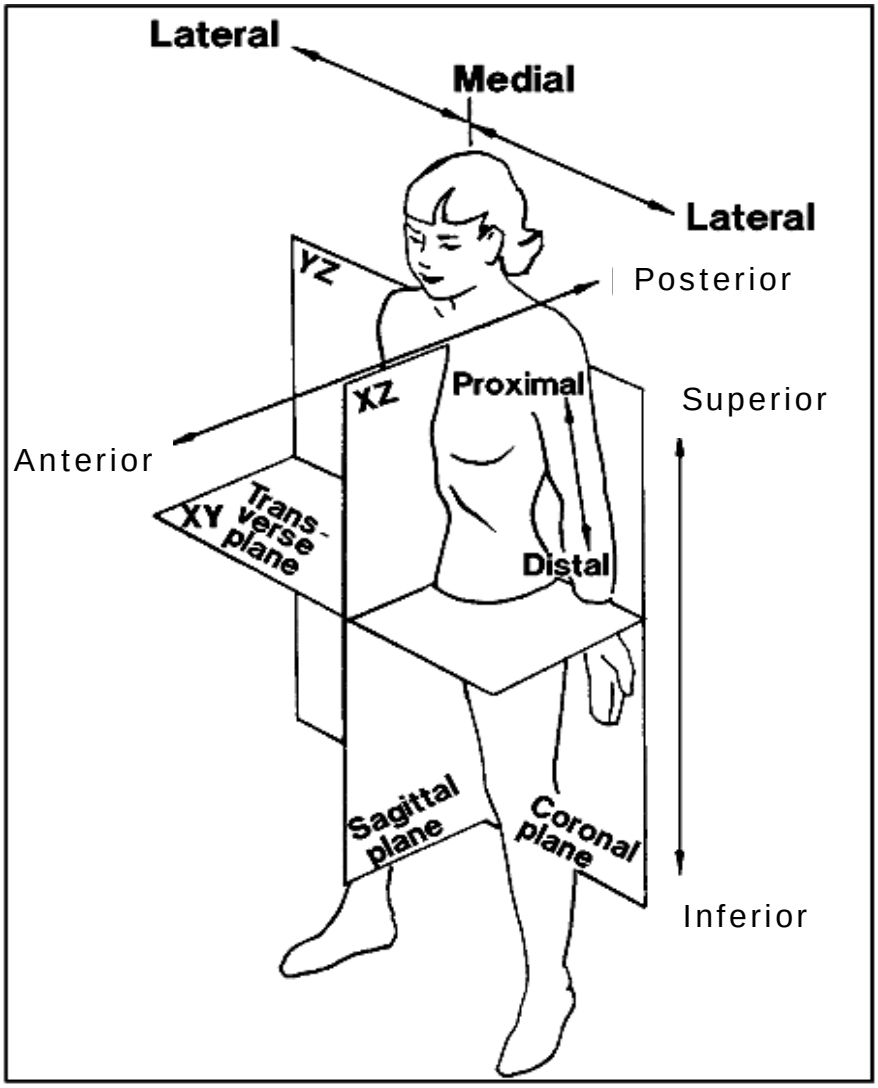

The pelvis is made up of the two innominates (os coxae), the sacrum and coccyx. Each innominate (os coxa) is made up of three fused bones: the ilium, ischium, and pubis. Those three bones come together at the hip socket (acetabulum).

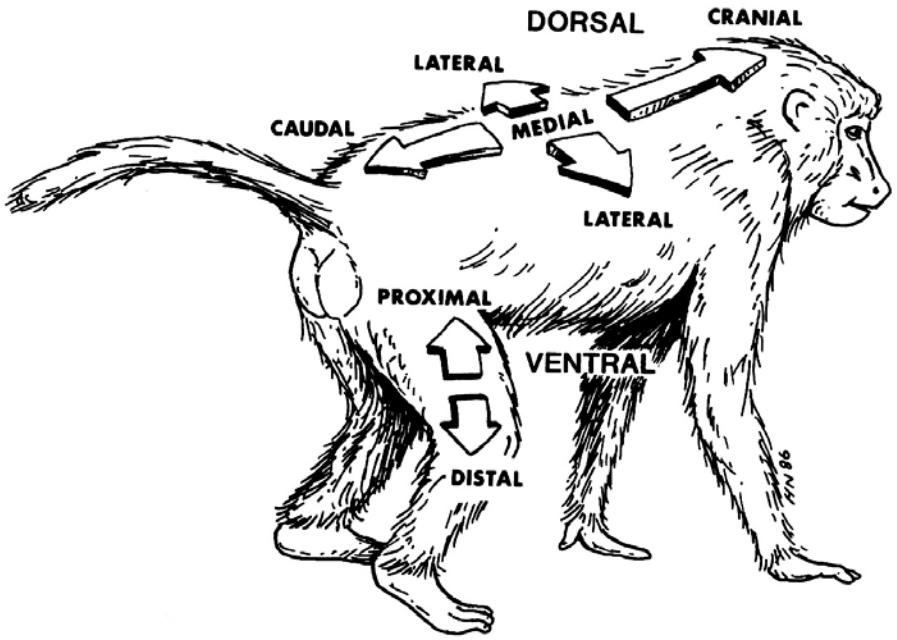
# Hand and foot



# Anatomical directions



# Additional terms

| | |
|---|---|
| **skull** | the entire bony framework of the head, including the lower jaw (mandible) |
| **cranium** | the skull without the mandible (pl. crania) |
| **postcranium** | all of the skeleton except the skull (pl. postcrania) |
| **axial skeleton** | refers to the bones of the skull and trunk, including the vertebrae, ribs, and sternum |
| **appendicular skeleton** | refers to the bones of the limbs, including the shoulder and pelvis |
| **articulation (to articulate)** | the meeting or intersection of two or more bones at a joint |
| **standard anatomical position** | the position from which we describe the body; consists of a human standing, feet together and pointing forward, palms out, thumbs facing away from the body, looking forward, with none of the long bones crossed from the viewer's perspective |
| **flexion** | bending movement that *decreases* the angle between two parts |
| **extension** | opposite of flexion; a straightening movement that *increases* the angle between two parts |
| **abduction** | pulling a structure or part *away* from the midline of the body (e.g., spreading fingers or toes, raising arms to the side) |
| **adduction** | opposite of abduction; bringing a structure or part *closer* to the midline of the body (e.g., dropping arms to the side) |
| **palmar** | the palm surface of the hand (opposite of dorsal) |
| **plantar** | the sole surface of the foot (opposite of dorsal) |
| **plantarflexion** | extending the foot at the ankle |
| **dorsiflexion** | flexing the foot at the ankle |
| **pronation** | rotation of the forearm so that the palm faces down |
| **supination** | rotation of the forearm so that the palm faces up (i.e. is supine) |

# Lab exercises

Using the figures above and the material at the stations around the lab room, spend some time becoming familiar with the bones of the human body and with anatomical terminology. Answer the questions below.

**Station 1 – The skull**

1. The cranial sutures are tight interlocking fibrous joints connecting cranial bones. What bones articulate to form the following sutures:

a) coronal _____

b) sagittal _____

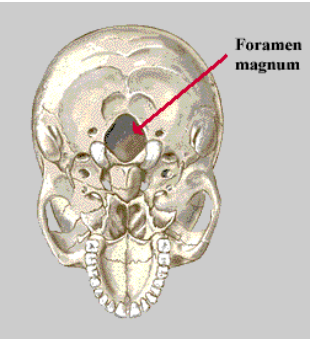
c) lambdoidal _____

2. Name any three bones that help make up the eye socket (orbit).

3. What is the difference between the skull and the cranium?

4. Name two bones of the cranium that are anterior to the parietal bones.

5. What bone surrounds the <u>foramen magnum</u>, the large hole in the base of the cranium through which the spinal cord passes?



**Station 2 – The dentition**

6. Which bone holds the upper teeth?  The lower teeth?

7. What are the different types of teeth?

8. How many of each type are there in the maxilla and the mandible (per quadrant, or one side, of the maxilla and the mandible) in a typical adult?

9. Are the premolars mesial or distal relative to the molars?

**Station 3 – The upper limb**

10. Name the three long bones of the upper limb (the arm).

11. What bone(s) is proximal to the radius? Medial?

12. Is the thumb medial or lateral in standard anatomical position?

13. What bones make up the hand?  How many of each type are there?

14. Which way does the palm face in standard anatomical position?

**Station 4 – The thorax and shoulder**

15. What two bones make up the shoulder joint along with the humerus? With which of these bones does the humerus directly articulate?

16. How many pairs of ribs are there?

17. The ribs articulate anteriorly with the _____ and posteriorly

with the _____ vertebrae.

**Station 5 – The vertebral column and the pelvis**

18. What are the different types of vertebrae? How many of each are there?

19. Name the three bones that make up the os coxa.

20. Is the vertebral column part of the axial or appendicular skeleton?

21. What is the coccyx?

**Station 6 – The lower limb**

21. Name the three long bones of the lower limb (the leg).

23. Name the three bones that make up the knee joint. With which bone does the patella articulate?

24. What bones make up the foot?  How many of each are there?

25. What bone is lateral to the tibia?

26. In standard anatomical position, is the calcaneus (the heel bone) anterior or posterior to the metatarsals?

**Some helpful websites for study and practice:**

http://www.eskeletons.org (note: click on the human skeleton)

http://msjensen.cehd.umn.edu/webanatomy/skeletons_skulls/default.html