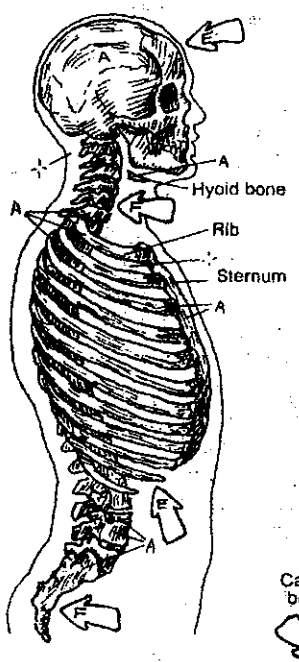
Name _____ Date _____ Per ____

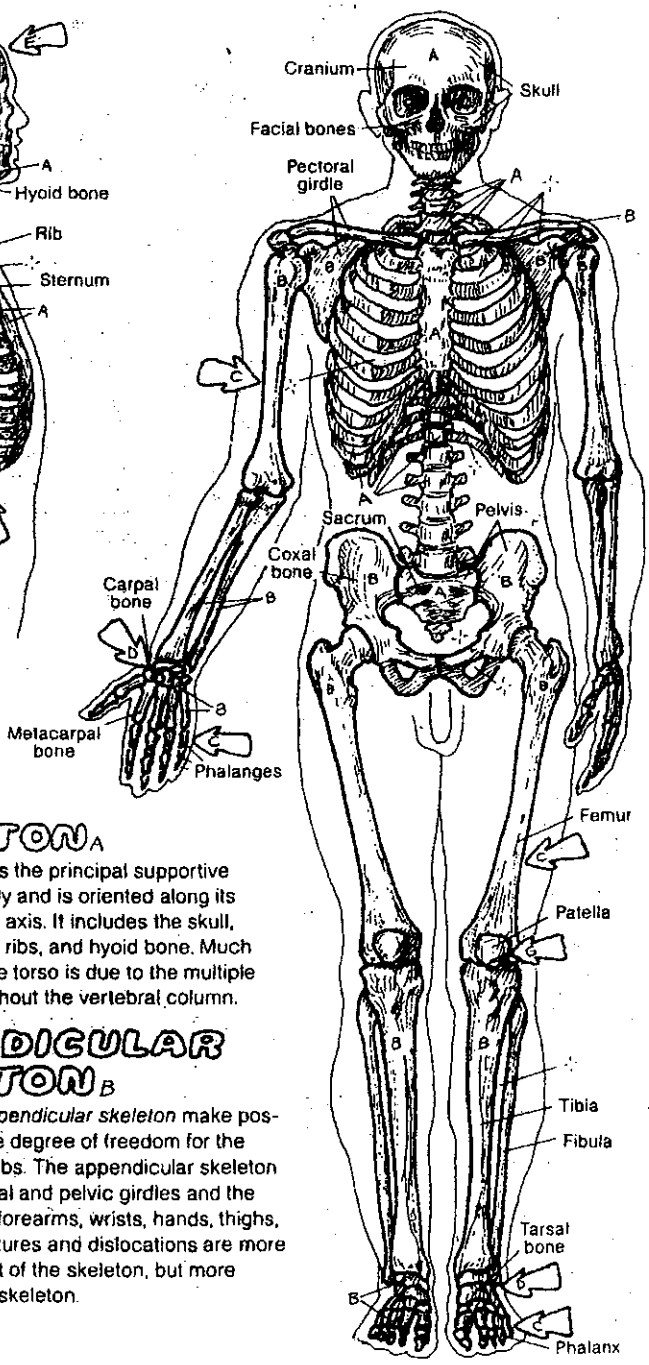
# III. SKELETAL SYSTEM
# AXIAL/APPENDICULAR SKELETON

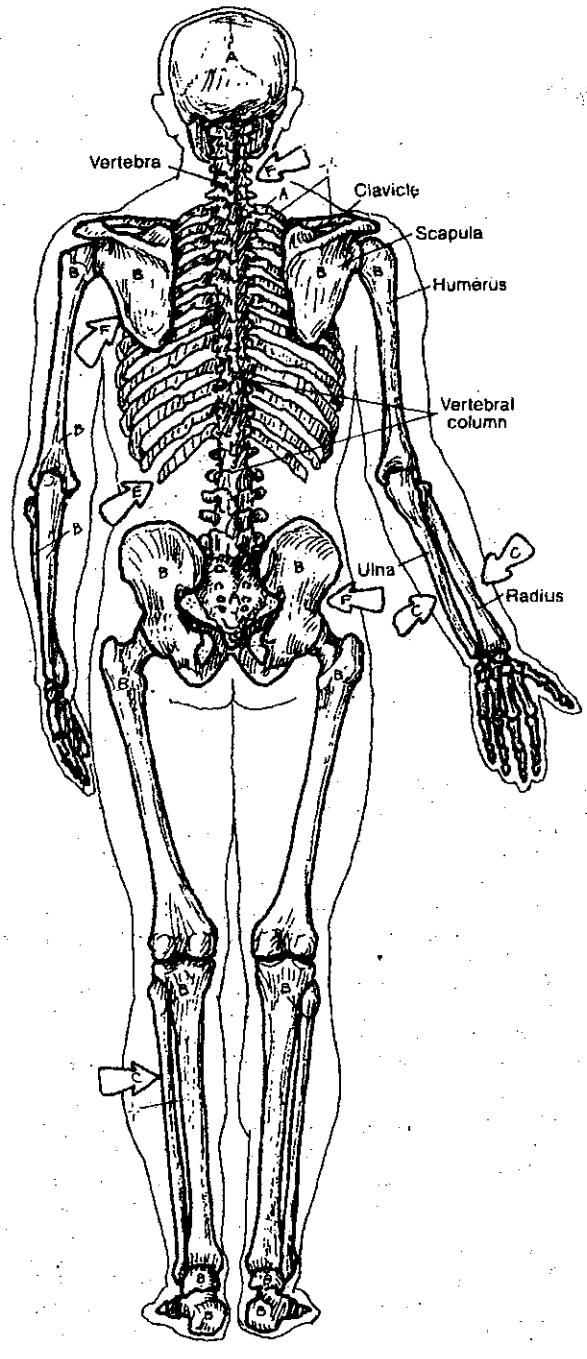
CN: Use light but contrasting colors for A and B.
(1) First color the axial skeleton A in all three views.
Do not color the intercostal spaces.
(2) Color the appendicular skeleton B.
Note that the bones labeled A are drawn in a lighter line than B.
(3) Color the arrows identifying bone shape/classification.

## CLASSIFICATION OF BONES:*
LONG C
SHORT D
FLAT E
IRREGULAR F
SESAMOID G

Bones have a variety of shapes and defy classification by shape; yet such a classification generally exists. *Long bones* are clearly longer in one axis than in another; they are characterized by a medullary cavity, a hollow diaphysis of compact bone, and at least two epiphyses; e.g., femur, phalanx. *Short bones* are roughly cube-shaped; they are predominantly cancellous bone with a thin cortex of compact bone; no cavity; e.g., carpal and tarsal bones. *Flat bones* (cranial bones, ribs) are generally more flat than round, and *irregular bones* (scapula, vertebrae) have two or more different shapes; e.g., the scapula, with a flat surface, and irregular-shaped spine. Bones not specifically long or short fit this latter category. *Sesamoid bones* are developed in tendons (e.g., patellar tendon); they are mostly bone, often mixed with fibrous tissue and cartilage. They have a cartilaginous articular surface facing an articular surface of an adjacent bone; they may be part of a synovial joint ensheathed within the fibrous joint capsule. They are generally pea-sized, and are almost always found in certain tendons/joint capsules in hands and feet, and occasionally in other articular sites of the upper and lower limbs. The largest is the patella, in the tendon of quadriceps femoris. Sesamoid bones resist friction and compression, enhance joint movement, and may assist local circulation.




## AXIAL SKELETON A

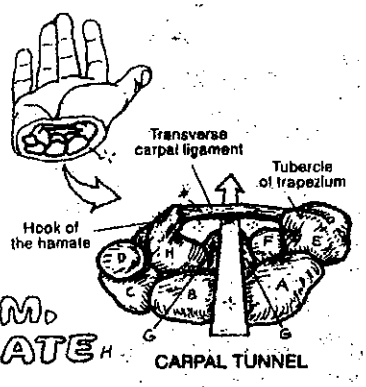
The *axial skeleton* is the principal supportive structure of the body and is oriented along its median longitudinal axis. It includes the skull, vertebrae, sternum, ribs, and hyoid bone. Much of the mobility of the torso is due to the multiple articulations throughout the vertebral column.

## APPENDICULAR SKELETON B

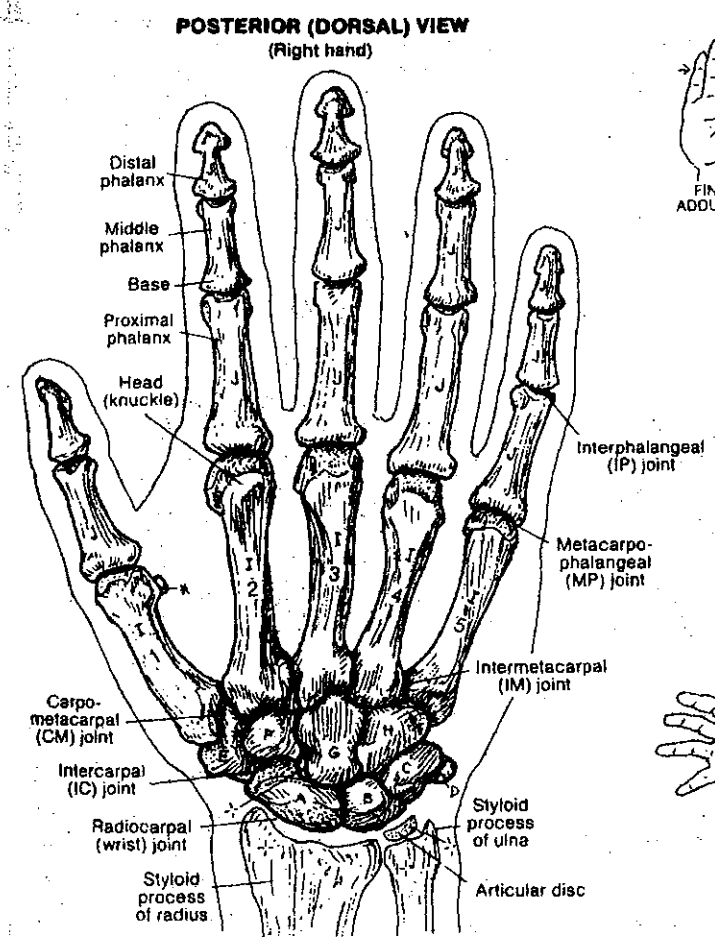
The joints of the *appendicular skeleton* make possible a considerable degree of freedom for the upper and lower limbs. The appendicular skeleton includes the pectoral and pelvic girdles and the bones of the arms, forearms, wrists, hands, thighs, legs, and feet. Fractures and dislocations are more common in this part of the skeleton, but more serious in the axial skeleton.

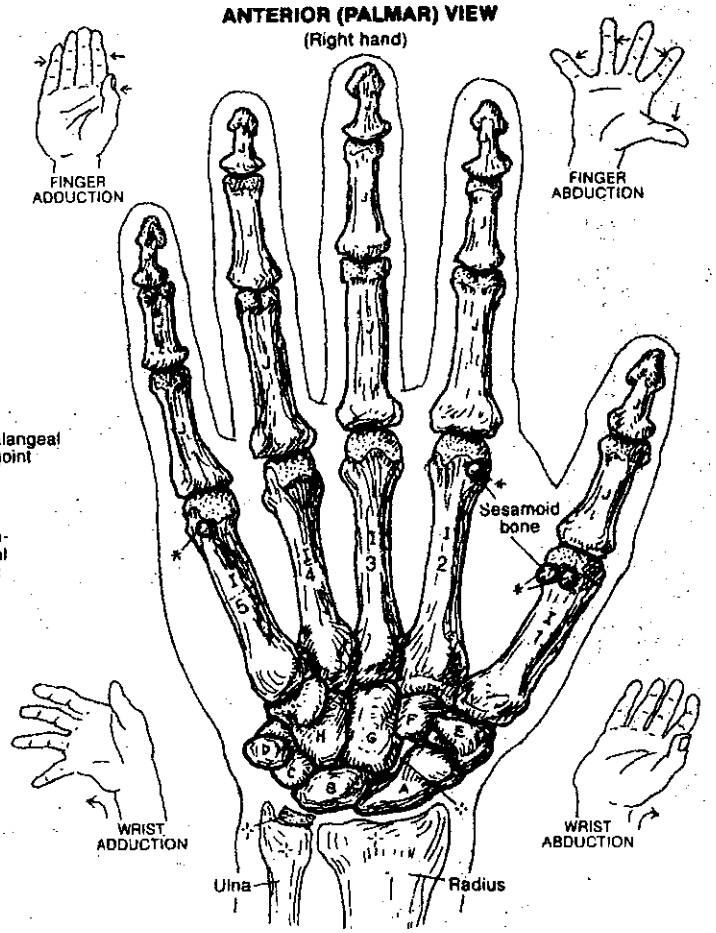
# III. SKELETAL SYSTEM / UPPER LIMB
## WRIST AND HAND BONES

**CM:** Use two light colors other than those used on Plates 25 and 26 for I and J. (1) Color each bone, or bone group, in all three major views simultaneously. Note the hand drawings which demonstrate movements at the joints. (2) Color the bones and ligament of the carpal tunnel. You may wish to color those bones in their location in the hand to the left.




CARPALS (8):* SCAPHOID$_A$ LUNATE$_B$ TRIQUETRUM$_C$ PISIFORM$_D$ TRAPEZIUM$_E$ TRAPEZOID$_F$ CAPITATE$_G$ HAMATE$_H$
METACARPALS (5)$_I$ PHALANGES (14)$_J$




The hand is a most remarkable device. It is perhaps the most highly evolved mechanical structure of our bodies. Movement of the hand and wrist is made possible by the architecture of the joints among the bones. The wrist joint is formed by the distal articular surface of the radius and the distal surface of the articular disc (just distal to the ulna) with the proximal articular surfaces of the *scaphoid, lunate,* and *triquetrum* bones. Forces transmitted from a fall on the hand to the wrist pass largely through the scaphoid, lunate, and radius; thus, fractures of the scaphoid and distal radius are common. The intercarpal (IC) joints work in linkage with the wrist joint. Note that the *carpal bones* are arranged in two rows: distal and proximal. A strong handgrip is dependent upon a neutrally positioned or extended wrist, as shown in the small illustration showing finger flexion. With the wrist in flexion, the hand or finger grip is weak.

Using your own hand, in conjunction with coloring, note that each hand normally has 5 digits (there can be fewer or more). Note that each digit has 3 *phalanges* except the thumb which has two. Note that the interphalangeal (IP) joints are limited to movements of flexion/extension. The *metacarpals* support the hand proximal to the fingers, and the MP joints permit the added movements of adduction/abduction. Of the CM joints, the thumb has exceptional movement (1st CM joint: saddle type, synovial); when moving the thumb toward the little finger in an arcing motion, note that the thumbnail rotates 90°, reflecting medial rotation of the first metacarpal on the *trapezium*. The 5th CM joint works during cupping of the hands when the 1st and 5th metacarpals are brought together.