

## THE SKELETAL SYSTEM - THE SKULL

The human skull can be divided into two regions: the cranium, which contains the brain, and the bones of the face, which support and protect the eyes, nose, ears, and mouth.

The cranium consists of eight broad thin bones forming a dome-shaped structure. The soft brain lies beneath this structure. The eight bones include a single frontal bone which forms the forehead, the occipital bone which forms the back of the skull, two parietal bones on the top of the skull, two temporal bones in the temple area above the ears, and two sphenoid bones behind the eyes.

The wavy lines in the cranium are called sutures. They mark the areas where bones are joined in the skull. The bones of the cranium are not fused together in newborn babies, thus allowing for the skull and brain to grow. In an adult, however, they form immovable joints.

There are fourteen bones that make up the face of the skull. We can feel and see the outline of only a few of these bones. These bones include the cheekbones, or zygomatic bones, the nasal bones of the bridge of the nose, the upper jaw or maxilla, and the lower jaw or mandible.

### Questions

1. What is the top part of the skull called? \_\_\_\_\_
2. What is the name of the lower jaw? \_\_\_\_\_
3. How many bones does your skull contain? \_\_\_\_\_
4. What does your cranium protect? \_\_\_\_\_
5. What is a joint in the cranium called? \_\_\_\_\_

### Activities

1. Locate the Front View Skull on Activity Sheet 1 and the Back View Skull on Activity Sheet 2. Color each of the following bones as indicated (if the bone is one of a pair, color both bones the same color): color the frontal bone brown, the occipital bone black, the parietal bones yellow, the temporal bones blue, and sphenoid bones purple, the zygomatic bones orange, the nasal bones black, the maxilla red, and the mandible green.
2. Cut out the Front View Skull and glue it near the top of your front view display sheet. Then, cut out the Back View Skull and glue it near the top of your back view display sheet.
3. Label the occipital bone on your back view display sheet. Label the parietal bones and the mandible on both display sheets. Label the rest of the bones underlined above on your front view display sheet.

## THE SKELETAL SYSTEM - THE SPINAL COLUMN

The spinal column or backbone is the central support of the body. It consists of a flexible column of bones or vertebrae which are stacked on top of each other like blocks. The first seven vertebrae form the neck region and are called cervical vertebrae. The next twelve vertebrae each have a pair of ribs attached to them and are called thoracic vertebrae. The next five vertebrae form the lower back and are called lumbar vertebrae. The next five vertebrae are fused into one bone called the sacrum. The hipbones, collectively called the pelvis, are attached to the sacrum. The last four vertebrae are also fused into one bone, the coccyx or tail bone. There are thirty-three vertebrae in all. Only twenty-four of these are true or movable vertebrae, however. The remaining nine are fused into the two fixed bones at the base of the column.

Between the individual vertebrae are small discs of cartilage which serve as shock absorbers. In the center of each vertebra is a vertical hole. The holes of all the vertebrae line up to form a long canal. Located in this canal is the spinal cord which conveys nerve messages up and down the body.

### Questions

1. How many individual bones do you find in your spinal column? \_\_\_\_\_
2. What is a single backbone called? \_\_\_\_\_
3. What are the shock absorber pads found between the vertebrae made of? \_\_\_\_\_
4. To what region of the vertebral column do the hips attach? \_\_\_\_\_
5. What type of vertebrae have ribs attached to them? \_\_\_\_\_

### Activities

1. Locate the Front View Spinal Column on Activity Sheet 1 and the Back View Spinal Column on Activity Sheet 2. Color the vertebrae brown and the cartilage discs yellow. Also, on your back view display sheet, color the vertebrae on the back view of the skull brown.
2. Cut out the Front View Spinal Column and glue it to the front view display sheet at the bottom of the skull. Cut out the Back View Spinal Column and glue it to the back view display sheet at the bottom of the skull.
3. On the front view display sheet label a vertebra and a cartilage disc. On the back view display sheet label a vertebra.

## THE SKELETAL SYSTEM - THE CHEST OR RIB CAGE

The chest is formed by twelve pairs of ribs attached to the spinal column at the back and to the sternum or breastbone in the front. The sternum is a single, dagger-shaped bone divided into three general regions. The upper part is the manubrium. The central part is called the body. The lower portion is known as the xiphoid process. The sternum supports the chest wall and serves as an attachment for numerous muscles.

The connection of the ribs to the sternum is made by cartilage. The cartilage gives the rib cage the flexibility it needs to expand during inhalation. The top seven pairs of ribs are called true ribs since they connect directly to the sternum. The bottom five pairs of ribs are called false ribs since they do not connect directly to the sternum. The top three of these five pairs of ribs connect to the cartilage of the seventh pair. The bottom two pairs, called floating ribs, do not attach in the front.

The arms are attached to the skeleton at the shoulder girdle or pectoral girdle. It is called a girdle because the bones make a sort of ring around the body. The ring or girdle consists of the two collar-bones or clavicles in the front and the two shoulder blades or scapulas in the back. The legs attach to the skeleton at the hip girdle or pelvic girdle formed by the two pelvic or hipbones.

### Questions

1. How many pairs of ribs does a human normally have? \_\_\_\_\_
2. How many pairs of ribs are called "true ribs"? \_\_\_\_\_
3. What are the bottom two pairs of ribs called? \_\_\_\_\_
4. What is the proper name for the breastbone? \_\_\_\_\_
5. The shoulder girdle is also called the \_\_\_\_\_ girdle.

### Activities

1. Locate the Front View Rib Cage on Activity Sheet 1 and the Back View Rib Cage on Activity Sheet 2. Color the ribs orange, the sternum red, the cartilage that connects the ribs to the sternum purple, the clavicles green, and the scapulas blue.
2. Cut out the Front View Rib Cage and glue it to the front view display sheet as indicated. Cut out the Back View Rib Cage and glue it to the back view display sheet as indicated.
3. On both of the display sheets, label a clavicle, scapula, rib, and cartilage connection. On the front view display sheet label the sternum.

## THE SKELETAL SYSTEM - THE ARMS AND LEGS

The arm is divided into three general regions. The first region is the upper arm. It consists of a single bone called the humerus. The second region is the lower arm. It consists of two bones, the radius and the ulna. The radius is nearest the thumb and rotates around the ulna making a small circle whenever the hand is turned over. The ulna does not rotate. The third region, called the hand, is divided into the wrist, palm, and fingers. The wrist is composed of eight small bones called carpals, roughly arranged in two rows. The palm is made of five long bones called metacarpals. The fingers are called phalanges. Each finger has three phalanges except the thumb which has only two phalanges.

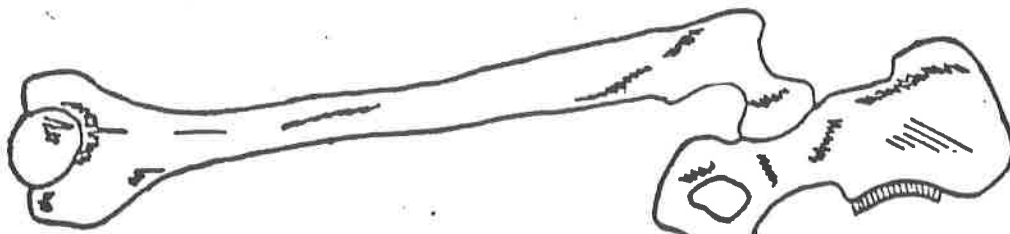
The leg compares very closely with the arm. The upper leg has one bone. It is called the femur. The femur is the largest and strongest bone in the skeleton and attaches to the hip or pelvic bone. There are two bones in the lower leg, a large shinbone, the tibia, and a smaller bone, the calf or the fibula. The foot is divided into the ankle, sole, and toes. The ankle contains only seven bones instead of eight as in the wrist. They are the tarsals. The sole consists of five long bones, the metatarsals. There are the same number of toes, also called phalanges, as fingers. One bone is found in the leg that has no counterpart in the arm. It is the kneecap or patella.

### Questions

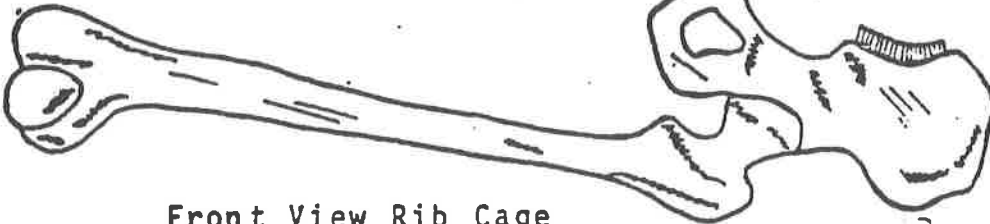
1. What bone is found in the leg without a counterpart in the arm?
2. How many bones are there in a wrist? \_\_\_\_\_
3. What is the largest bone in a skeleton? \_\_\_\_\_
4. Which lower arm bone is capable of rotation? \_\_\_\_\_
5. What is the name for fingers and toes? \_\_\_\_\_

### Activities

1. Locate the Front View Lower Legs, Front View Arms, and Front View Hip and Upper Legs on Activity Sheet 1, and the Back View Lower Legs, Back View Arms, and Back View Hip and Upper Legs on Activity Sheet 2.
2. Color the following bones as indicated (if the bone is one of a pair, color both bones the same color): color the humerus and the femur black, the radius and the tibia red, the ulna and the fibula blue, the carpals and the tarsals purple, the metacarpals and the metatarsals orange, the phalanges yellow, the pelvic girdle green, and the patella brown.
3. Cut out the Front View Lower Legs, Front View Arms, and Front View Hip and Upper Legs and glue them to the front view display sheet. Cut out the Back View Lower Legs, Back View Arms, and Back View Hip and Upper Legs and glue them to the back view display sheet.
4. On both of the display sheets, label the bones underlined above. The patella will appear on the front view display sheet only.

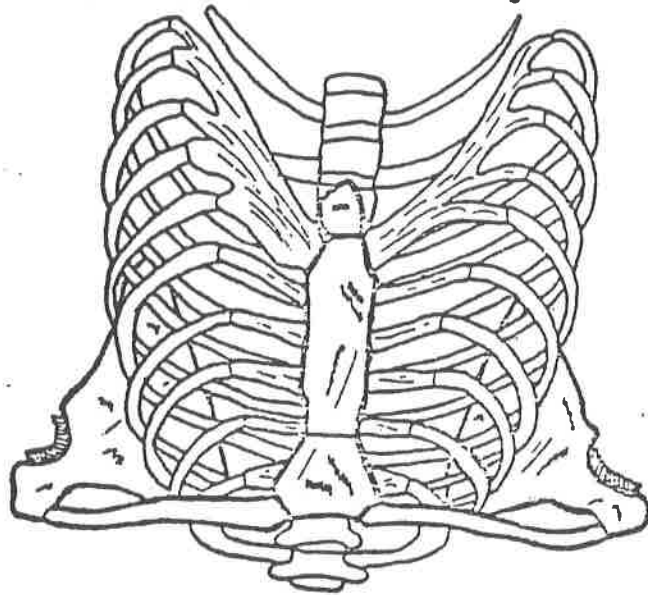
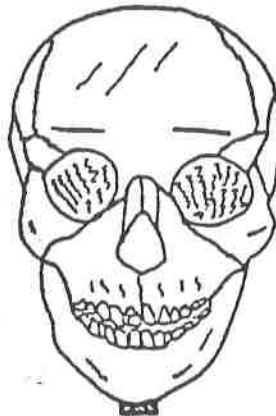


Front View Hip and Upper Legs



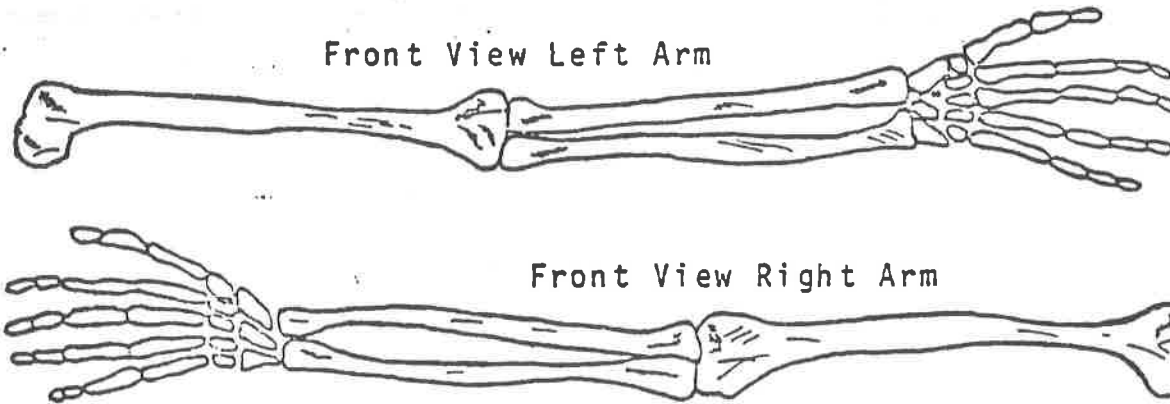
Front View Rib Cage

Front View Skull

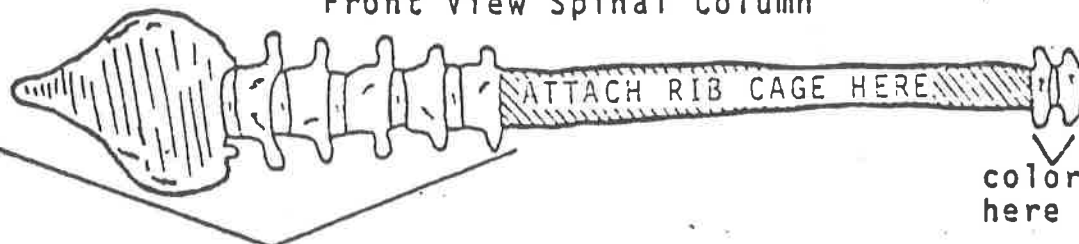


Front View Left Arm

Front View Right Arm

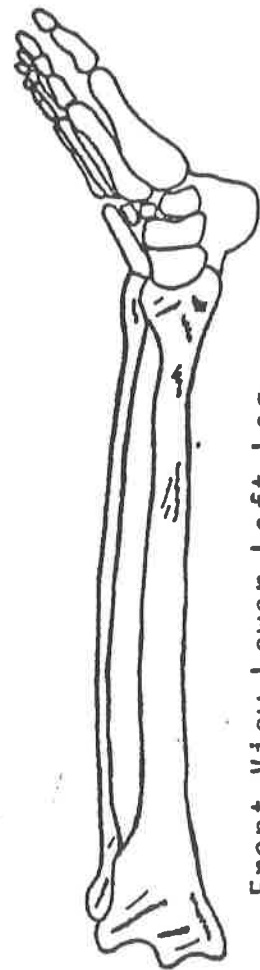


Front View Spinal Column

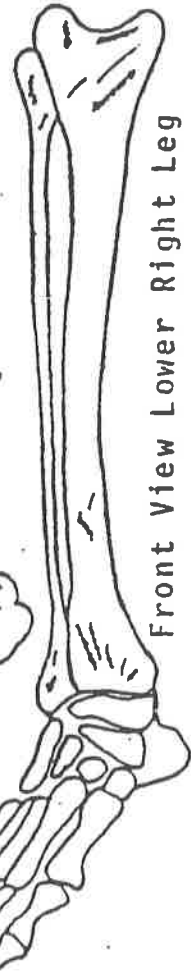


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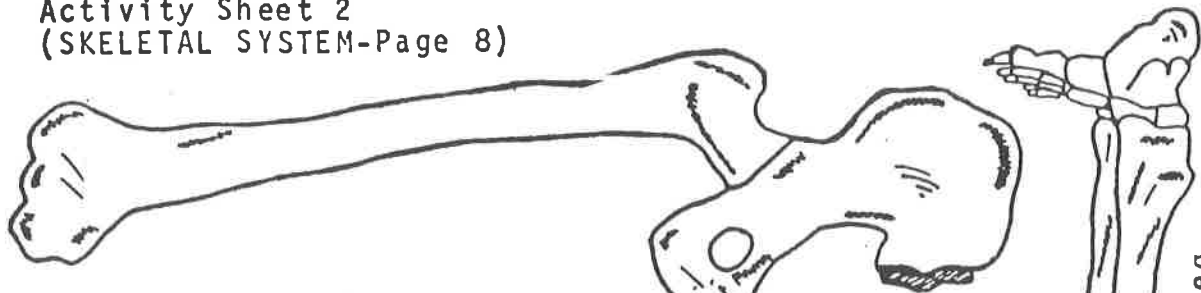
Front View Lower Left Leg



Front View Lower Right Leg



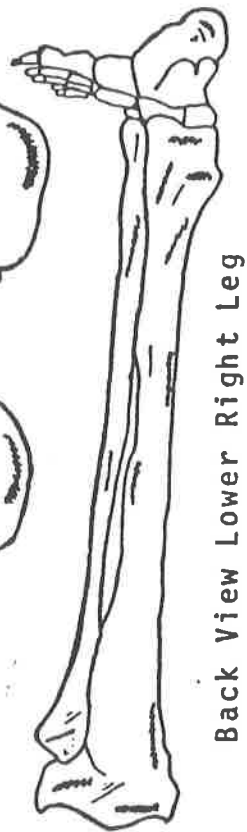
Activity Sheet 2  
(SKELETAL SYSTEM-Page 8)



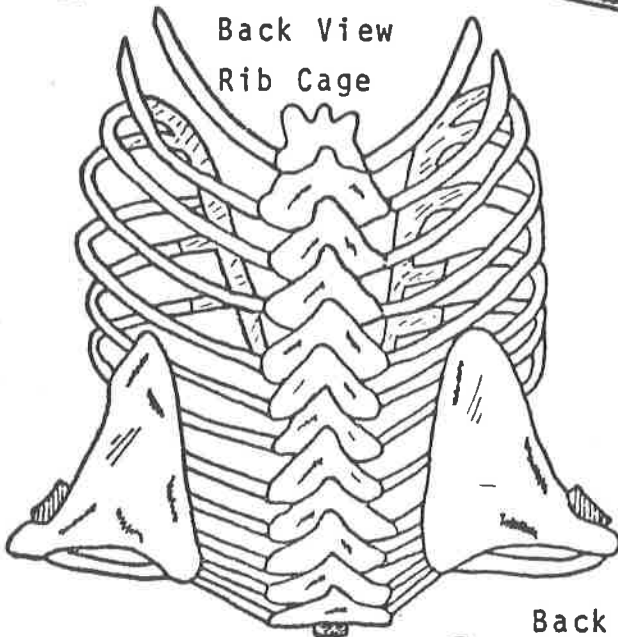
Back View Hip and Upper Legs



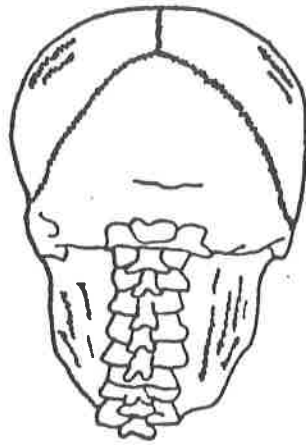
Back View Skull



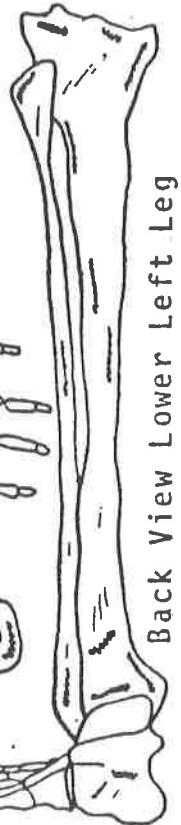
Back View Lower Right Leg



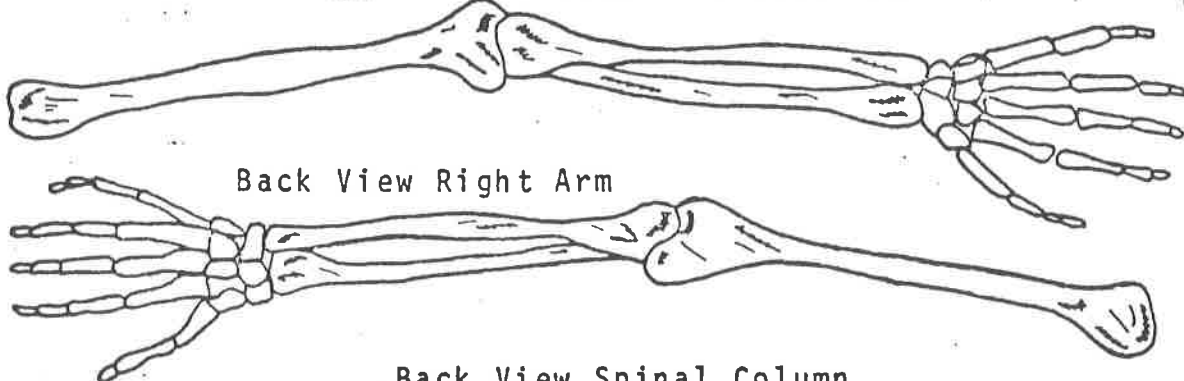
Back View Rib Cage



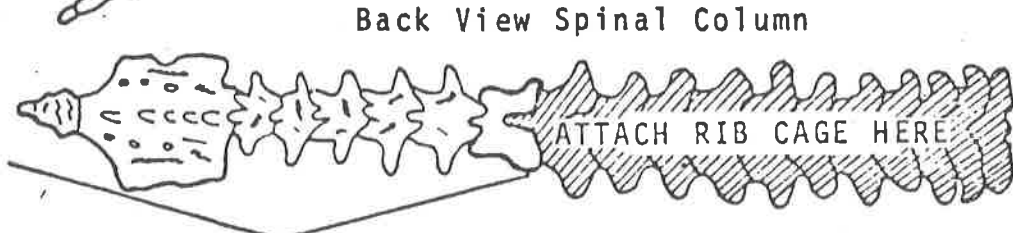
Back View Left Arm



Back View Lower Left Leg



Back View Right Arm



Back View Spinal Column

color here

