

Axial Skeleton

Skull _____ Bones

Cranium _____ Bones

Frontal Bone: this bone contains *sinuses*, which can be seen where the bone is cut. They communicate with the nose and are normally air-filled. What happens when they fill with mucus or bacteria instead? _____

Parietal bones: form the superior lateral aspect of the cranium.

Temporal bones: find the *external auditory meatus*. What is its function?

_____ It is located below the *squamous* portion of the bone and enters into the *Petrous* portion, which houses the hearing and balance apparatus. Notice the socket for the jawbone (TMJ) above the *Mastoid process* (anchors the sternocleidomastoid muscle, and posterior to the *zygomatic process*, which forms the posterior portion of the cheek bone.

Occipital bone: locate the *foramen magnum*, which translates as "big hole" in Latin. What goes through it? _____ Notice the smooth bumps on each side of the foramen. These articulate with the uppermost vertebra, forming a joint which permits you to nod your head "yes".

Sphenoid bone: one of the most oddly-shaped bones in the body - be sure to see it on the exploded skull. It is also the most medial bone of your skull. On the superior interior surface locate the *sella turcica*, Turkish saddle, which protects the pituitary, master, gland, of the body. Locate the optic foramen. Judging from its name, the nerve from the _____ passes through it; this is the _____ cranial nerve.

Ethmoid bone: this roughly box-shaped bone is in the nose area. Look inside the skull and find the *cribriform plate*, which passes the _____ cranial nerve, on either side of the *crista galli*, which serves to anchor the *falx cerebri*, the meninx which surrounds, stabilizes, and protects the cerebral hemispheres. Look into the nose and observe the *perpendicular plate*, which helps separate the two nostrils. The ethmoid bone also contains *sinuses* and the superior and middle *nasal concha* structures.

Facial bones

Maxillae (two bones fused into one): this contains your largest sinuses. It also has 14 - 16 teeth. By looking at other skulls in the room, you will be able to see great variety in the wisdom teeth - some present, some absent, some impacted. The maxillae form the anterior roof of the mouth (hard palate).

Palatine bones: pair of "C" shaped bones forming the posterior portion of the hard palate and the floor of the orbit of the eye.

Nasal bones: form the _____ of the nose. What forms the tip? _____

Zygomatic bones: form the anterior portion of the cheek bone.

Lacrimal bones: are very small and delicate. *Lacrimae* means “tears” in Latin - note the tear duct formed by the lacrimal and maxillae bones; they serve to drain fluid from the eye socket.

Vomer: this bone, along with the ethmoid, form the nasal septum; they are both midsagittal.

Inferior Conchae: two small twirled, turbinate, bones on either side of the perpendicular plate of the ethmoid below the middle concha bones. These serve to “swirl” the air as it enters the nose, throwing it, and any dust or dirt it contains up against the mucous membrane; this serves to help warm, cleanse, and moisten the air.

Mandible: the lower jaw, bearing the rest of the teeth; it has a *body*, the *angle*, and the *ramus*. Note the smooth rounded processes which articulate with the temporal bones.

Ossicles of the ear: there are three small bones (ossicles) in each ear; they are named for common objects which they resemble: *Malleus* -hammer, *Incus* - anvil, and *Stapes* - stirrup. We will discuss these again during special senses.

Hyoid bone: this is present on some articulated skeletons; it is frequently lost. It is a U-shaped bone under the lower jaw and anchors the tongue, it does not articulate with any other bones.

Trunk

Vertebrae: the *body* of the vertebra is the heavy solid part. *Pedicles* support the vertebral arch with its *spinous and transverse* processes. What goes through the *vertebral foramen*? _____ Feel the spinous process on yourself. Back muscles attach to them. Locate the superior and inferior articulating processes and, on a complete vertebral column, see how they slide on each other so you can move your back and neck. What is found between the bodies? _____

Cervical vertebrae: are those in the neck region. How many are there? ____ Note especially the first one, called the *atlas*, which has no body. Observe how it pivots around the second, called the *axis*. This allows you to shake your head no. Note the odontoid process of the axis, comprised of the body the atlas lost. Check out the foramina in the transverse processes which allow for the passage of the vertebral arteries to supply blood to the brain.

Thoracic vertebrae: are in the thoracic region and have the _____ attached to them. Count these vertebrae: _____. Note how each of the middle thoracic vertebrae articulate with six other bones!

Lumbar vertebrae: have big bodies because they support the weight of the whole of your upper body. How many? ____ Feel these on yourself and on the skeleton. They serve as origin for some of the major thigh muscles.

Sacrum: in early life there are five separate vertebrae here, but they fuse together for greater strength. Note the sacroiliac articulation with the pelvic bone, *os coxa*.

Coccyx: commonly called the “tail bone”, this is a single bone in adults. In youth, it consists of four separate bones which eventually fuse.

Ribs: the upper 7 attach directly (by means of the costal cartilages) to the sternum anteriorly. These are known as *true ribs*. The lower 5 are called *false ribs* because they do not attach directly. The upper three attach to the rib above them. The lowest two have no anterior articulation and are therefore termed “floating” ribs.

Sternum: the common name is the _____. It consists of three parts, the *manubrium*, the *gladiolus* (body), and the *xiphoid process* (shield).

Appendicular Skeleton

Shoulder girdle ____ bones

Clavicle: this bone is commonly called the _____. Look at the point where the clavicle articulates with the sternum: this is the only articulation between the shoulder girdle (with the arm attached) and the trunk, axial skeleton.

Scapula: its common name is the _____. The scapula is extremely important in movements of the shoulder and upper arm, since a total of eleven muscles are attached to it (Notice the spine, processes and fossa for the attachments of these muscles.) Find the *glenoid cavity*, which articulates with the head of your arm bone, the *humerus*. (Compare this to the corresponding joint at the hip; can you see why the shoulder is much more easily dislocated?) Be able to distinguish a right scapula from a left.

Upper limb ____ bones

Humerus: the rounded proximal end which fits into the glenoid cavity of the scapula is called the head. At the distal end, be able to distinguish which surface articulates with the radius and which articulates with the ulna. Be able to distinguish a right humerus from a left.

Ulna: find it on yourself; no matter which way your forearm is turned, the ulna comes down on the little-finger side of the hand. Notice how snugly it fits onto the humerus, with projections of the ulna matching up with grooves in the humerus. Do you see why your arm cannot bend in reverse? The ulna is the “funny bone” because the ulnar nerve going around the proximal end is very exposed and easy to bump. You can always recognize the **U**lna by the **U**-shaped notch at the proximal end.

Radius: place your forearm on the table palm-up. Now flop your hand over and notice how your radius turns over your ulna. Do the same to one of the skeletons and see how the curved shape of the radius makes this possible. The **R**adius is easily identified by its perfectly **R**ound proximal head.

Carpals: are commonly called _____. How many? _____

Metacarpals: form the solid palm area of the hand. Be sure you can tell on the skeleton where the hand stops and the fingers begin.

Phalanges: how many are there in each finger? ____ in the thumb? ____ in one hand? ____ In both hands? _____

Pelvic Girdle ____ bones

Os coxae: are frequently called hip bones; they are created by the fusion of three bones, the *ilium*, the *ischium*, and the *pubis* bones. With your hands on your hips, you are actually touching the _____ bones, sit down on a hard surface; the projections you are supported on are the _____ bone; the bones forming the arch above and in front of the genital region are the _____ bones. Find the *acetabulum*, “vinegar cup”, which forms the socket of the hip joint.

Lower limb ____ bones

Femur: one of the most massive bones in the body, this is commonly called the thigh bone. Identify the head which fits into the acetabulum of the pelvis forming a very flexible and sturdy joint. The large bulge lateral to the head is the *greater trochanter* (you can feel it on yourself) while a smaller medial bulge is the lesser trochanter. Both serve for attachment of muscle. Be able to distinguish a left femur from a right.

Patella: generally called the _____.

Tibia: commonly known as the shin bone. Notice that it is the medial bone of the lower leg. On yourself, feel its distal bulge, *medial malleolus*, on the inner surface of the ankle.

Fibula: this is the smaller, more lateral bone of the lower leg. Proximally it articulates with the tibia. It provides the bump, *lateral malleolus*,

Tarsals ____ bones: you should know two of these by name:

Talus: articulates with the tibia and fibula, thus bearing most of the weight of your body at each step.

Calcaneus: forms your heel and serves for the insertion of the *Achilles* tendon.

Metatarsals: if these lost their arch you will suffer from _____.

Phalanges: How many in the big toe? ____ in each of the other toes? ____ Each foot? ____ Both feet? _____ In your whole body? _____