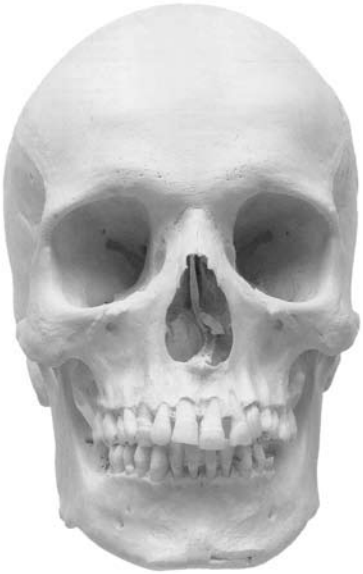
33" HUMAN Diorama



Discover the incredible workings of human anatomy — cast, finish, assemble & display an entire human skeleton!

HANDS-ON LEARNING
Skullduggery, Inc.

HUMAN SKELETON

30" Human Diorama

Read directions thoroughly before starting.

30" Human Diorama is a fun-filled educational kit that is a perfect introduction to the anatomy of the human skeleton. Did you know that there are 22 bones in the human skull? Learn to recognize and name the major bones of the body. Cast, finish, and assemble an entire skeleton. A 33" poster is provided to display your creation.

MATERIALS PROVIDED

- Information about the workings of the human skeleton.
- Casting (PerfectCast) material for one complete skeleton. To make more human skeletons, additional PerfectCast is available from your local retailer.
- 2 mold trays containing a complete human skeleton.
- Instructions on how to use the mold trays.
- Reference diagram to consult while constructing the human skeleton.
- 33" poster, glue and measuring scoop.
- Glow in the Dark Paint and foam brush to finish the skeleton.
- Bibliography.

MATERIALS NEEDED

- A container to mix PerfectCast and water. Any bowl large enough will work, but be sure to wash them immediately after using.
- Mixing utensil.

WARNING: Don't place hand in casting material while it is hardening. Don't pour excess material into drain or toilet bowl. Dispose of excess material in garbage.

Adult supervision suggested

INSTRUCTIONS

Flatten Poster

- Open the poster and place it on a flat surface.
- Put books or other heavy objects on the poster to smooth the creases.
- For best results, have the poster laminated or mounted on foam core or cardboard.

Casting

- Find an area with a flat, level, stable working surface, such as a counter-top, desktop or table. Make sure the surface is waterproof; some excess water may spill out of your container. Use a disposable container to mix the PerfectCast and water.
- Add the contents of the PerfectCast™ bag to 13 scoops of cool water in a large bowl.
- Mix for 2 minutes until smooth and tap the bowl on the table to release bubbles.
- Pour the mixture into the molds and tap the molds on the table to release bubbles.
- Wait at least 30 to 40 minutes before demolding. Once pieces are removed, let them dry overnight on newspaper before painting. Since the pieces will be glued to a paper poster, it is important that the pieces thoroughly dry before gluing them to the poster.

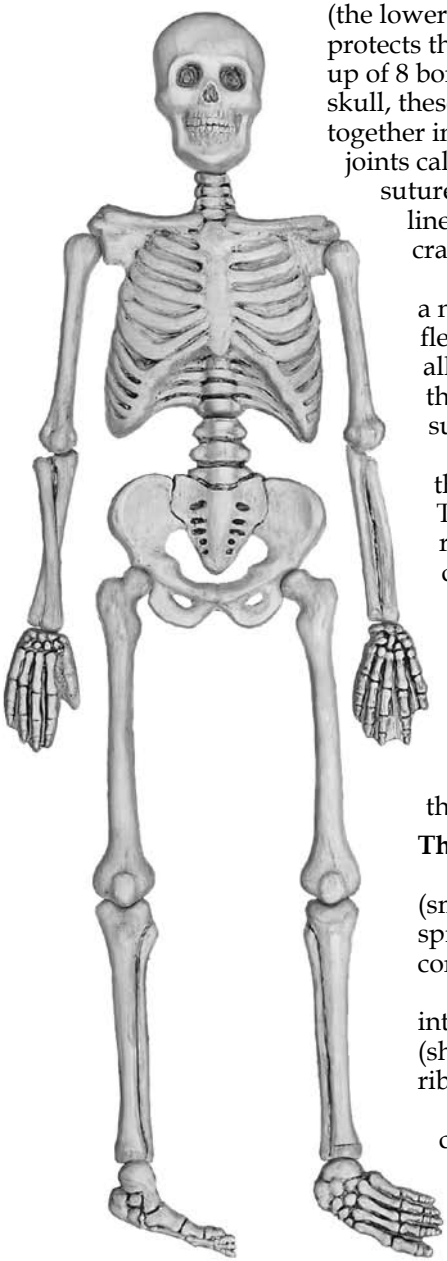
Finishing

- Paint your skeleton on newspaper to protect your table.
- Using the foam brush, paint the entire skeleton. When finished clean the bowl and foam brush.
- Read the information in the Human Diorama brochure to learn interesting facts about the human skeleton.

THE HUMAN SKELETON

The Skull

The entire skull consists of 22 bones, three basic sections: the cranium (the rounded part of the skull), the face, and the mandible (the lower jaw). The cranium protects the brain. It is made up of 8 bones. In a mature skull, these 8 bones are fused together in rigid (non-moving) joints called sutures. These sutures look like squiggly lines that run throughout the entire cranium.



Unlike a mature skull, the bones in a newborn baby's head are somewhat flexible. Soft spaces between the bones allow for growth. After the head grows, the bones will fuse together, forming the sutures.

The 13 facial bones protect the eyes, the nose, and the upper row of teeth. The muscles attached to these bones are responsible for moving your jaw and controlling your facial expressions such as when you smile or pout.

The mandible bone is the only movable portion of the entire skull. It contains the lower row of teeth and assists in chewing.

Connecting the head and torso (center of body) is the upper portion of the backbone known as the neck.

The Neck and torso

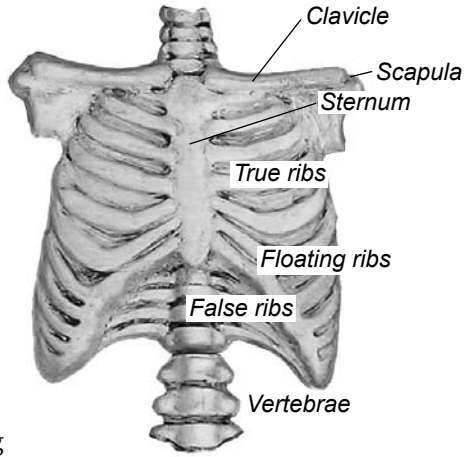
The neck consists of seven vertebrae (small bones which make up the spine). The neck supports the skull and contributes to head movement.

The bones of the torso can be divided into four basic sections: the pectoral girdle (shoulder area), the spine (backbone), the rib cage, and the pelvic girdle (hip area).

The pectoral girdle (shoulders) consists of 2 clavicles (collar bone) and 2 scapulas (shoulder blades). This is where the arms attach to the torso.

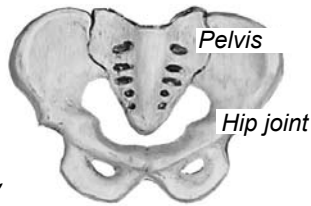
The spine, consisting of 26 bones called vertebrae, enables the human

body to stand upright, bend, and turn. Each vertebra is designed to protect the spinal cord and to provide support and flexibility for the back. The spinal cord runs through a protective hole in the middle of each vertebra. The rib cage is a flexible "bone box" that protects the heart and lungs.



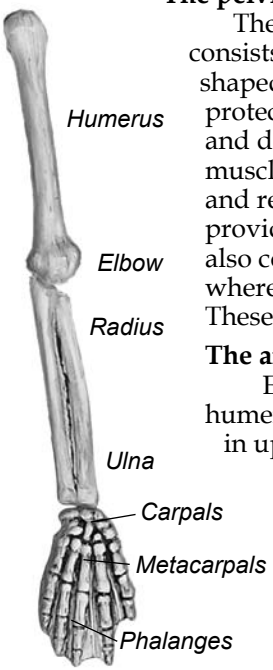
Comprised of 12 rib pairs, the rib cage connects to the spine in the back. In the front, the top 7 pairs of ribs are directly attached to the sternum (breast bone) by cartilage. These ribs are called the true ribs. The next two pairs of ribs are joined in the front, to the ribs above, by cartilage. They are called the floating ribs. The two lowest pairs of ribs are not connected to the sternum at all and are called false ribs.

The flat, resilient (springy) bones of the rib cage, along with their corresponding muscles, provide flexible protection for vital organs and room for the lungs to expand as you breathe. When breathing in, muscles lift the ribs upward and swing them outward, increasing the volume of the chest and sucking air into the chest.



The pelvis

The pelvis (hip bone) consists of two wide, bowl shaped-bones that support and protect the reproductive, urinary, and digestive organs. Broad muscles are attached to the front and rear of this large bone, extending down each leg to provide the mechanism with which to move. The pelvis also contains two hip joints. Each joint consists of a socket where the round ball at the top of each thigh bone fits. These joints connect the torso to the legs.



The arm

Each human arm is made up of three bones: the humerus, the radius, and the ulna. The humerus (bone in upper arm) fits into the socket of the shoulder joint. This is a ball and socket joint and is designed to provide full range of motion and stability to each of the arms. This durable joint, along with the accompanying muscles and ligaments, allows for heavy lifting with the arms. The humerus is connected to the radius and ulna (forearm) at the elbow (a hinged joint). Much like

a typical door hinge, the hinge joint does not move beyond a 180-degree angle. The radius and ulna bones run side by side from the elbow to the wrist (the joint of the hand). The radius is on the inside of the arm and is the longer of the two bones (located on the thumb side of the arm). The ulna is on the outside of the arm.

The hand

The hand is made up of the carpals (wrist bones), the metacarpals (palm), and the phalanges (fingers). Along with a complex set of ligaments, tendons, and muscles, the arm and hand bones are designed to work as a series of levers that can move in almost any direction.

Legs

Like the arms, each human leg is made up of three bones: the femur, the fibula, and the tibia.

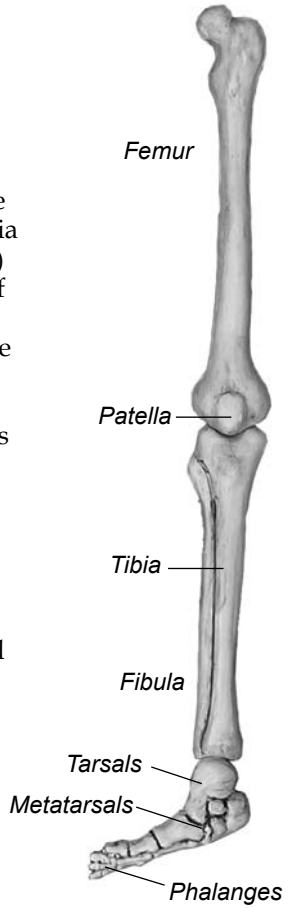
The femur (upper leg) is the long bone that is connected to the pelvis with a ball and socket joint at the hip. Femurs are the largest bones in the body. The femur is connected to the fibula and tibia (lower leg) at the knee joint. The patella (knee cap) is a small bone that covers and protects the joint of the knee.

The fibula and tibia bones (lower leg) run side by side from the knee to the ankle (the joint of the foot). The tibia is the largest of the two bones and is located toward the inside of the leg. The fibula is located toward the outside of the leg.

The ankle and foot

The ankle is made up of the tarsals (ankle bones), the metatarsals (heel and ball of foot), and the phalanges (toes). These bones, along with a complex web of ligaments, tendons, and muscles, withstand the intense weight and pressure created by walking, running, and jumping.

Cutting guide for magnets



GLOSSARY

ankle - the joint between the lower leg and foot; the largest bone of the ankle is the tarsus ball
socket joint - a joint that allows movement in many directions, i.e. the shoulders, hips, and thumb joints
carpals - bones of the wrist
cartilage - a tough material that acts as a cushion between two bones
clavicle - the two bones between the sternum and the shoulders
cranium - the rounded, top part of the skull
elbow - the hinged joint in the arm, between the upper and lower arm
false ribs - the tenth to the twelfth pairs of ribs which are not attached at the front
femur - the thigh bone, the largest bone in the body
fibula - the outer bone in the leg below the knee
floating ribs - the eighth to the tenth pairs of ribs, joined to the ribs above at the front
humerus - the bone in the upper arm
ligament - tough, rope-like material that holds bones together at a joint
mandible - the strong, curved bone that forms the lower jaw
metacarpals - bones of the hand, between the wrist and the fingers
metatarsals - bones of the foot, between the ankle and the toes
muscle - tissue mass that has the property of contracting and relaxing and which produces motion
patella - the bone protecting the knee
pectoral girdle - portion of the skeleton which provides support and attachment for the arms
pelvic girdle - portion of the skeleton to which the legs are attached
pelvis - the hip bones
phalanges - the bones of the fingers and toes
radius - the smaller bone of the forearm, on the same side of the arm as the thumb
rib cage -the area formed by the twelve pairs of ribs
scapula - the bones of the shoulders
spinal cord -large bundle of nerve tissue running down from the brain, protected by the spine
spine - the jointed back bones or vertebrae (bones protecting the spinal cord)
sternum - the breast bone, to which most of the ribs are attached
suture - an unmovable joint such as between adjacent flat bones of the skull
tarsals - bones of the ankle
tendon - tough rope-like tissue that connects a muscle to a bone
tibia - the bone at the front of the lower leg
torso - the center portion of the body between the head and the limbs
true ribs - the first to the seventh pair of ribs which are attached directly to the breast bone by cartilage
ulna - the largest bone in the forearm, on the same side of the arm as the smallest finger
vertebrae - the small bones in the back, joined together to make up the backbone or spine
vertebrates - all living organisms with vertebrae or a backbone

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