

## Human Anatomy and Diseases, Pt. 2

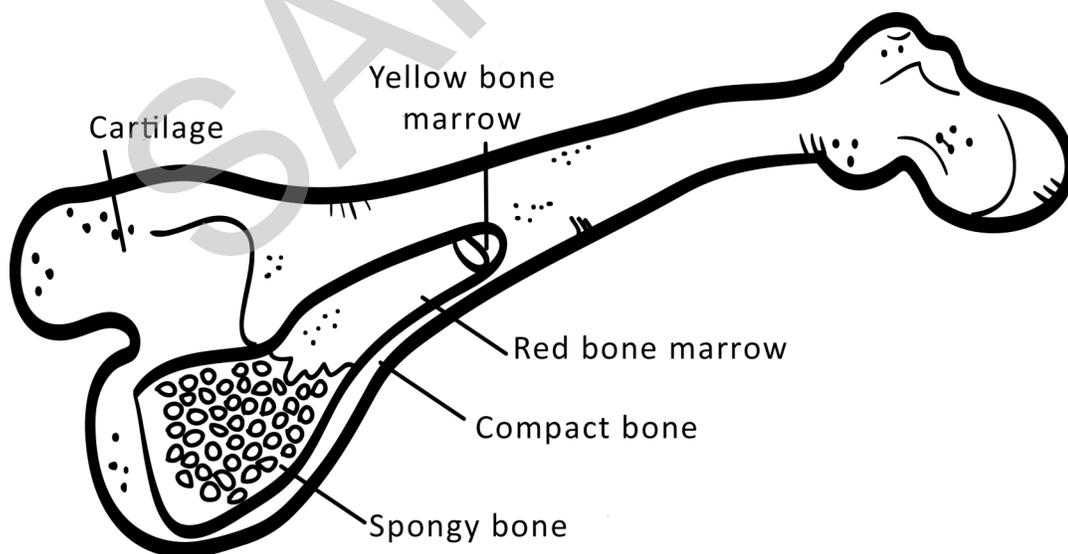
It's hard to imagine how many different pieces our bodies are made of. More than 10 trillion cells work together to form tissues, organs, and systems. We're going to look at several systems in this unit, and we're going to start with two we think of when we think about moving—the skeletal system and the muscular system. As we look at each system, we'll also look at some of the diseases and things that can go wrong in each one.



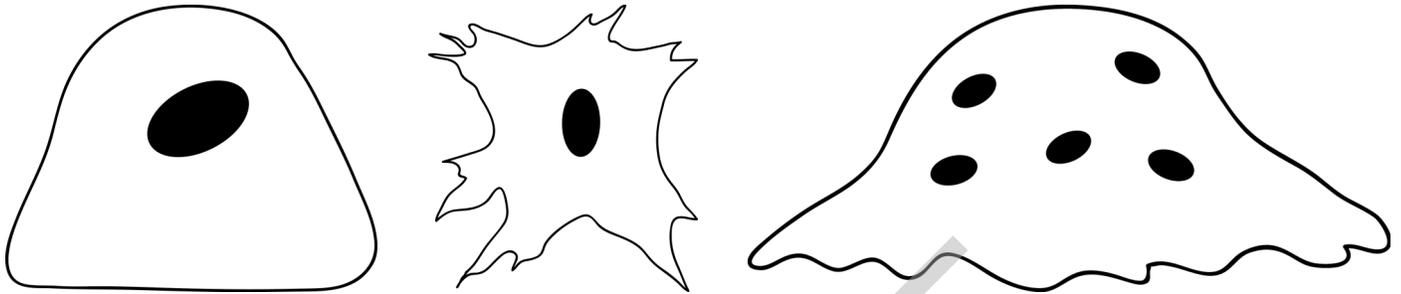
The first system we'll look at is the skeletal system. Not only does it include more than 200 bones, it also includes joints, ligaments, and cartilage that all work together to give your body structure.

Just like the rest of your body, bones are made of smaller parts. Most bones have a layer of **compact bone** (also called cortical bone) on the outside and **spongy bone** (also called cancellous or trabecular bone) beneath it. The spongy bone transfers the weight from the ends of the bones to the center. At the end of a type of bones called long bones, you'll find cartilage, which is a smooth tissue.

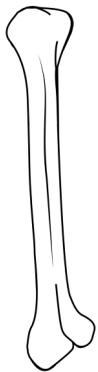
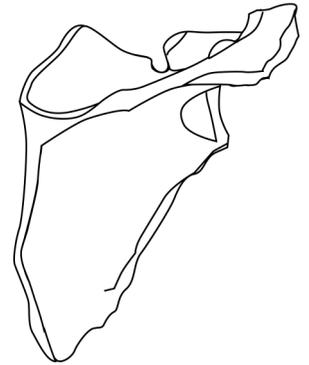
Most bones also have bone marrow inside. **Red bone marrow** is responsible for making blood cells. **Yellow bone marrow** is mostly made of fat.



Bone tissues have special cells that help the bone with its many functions. Your bones are made of minerals and also organic material such as **collagen**. Collagen is a fiber-like protein. Osteoblasts (below on the left) help build the collagen and deposit the minerals. Osteocytes (below in the middle) help balance the minerals in your body and help whenever there is stress on your bones from physical activity. Osteoclasts (below on the right) help with growth and healing.

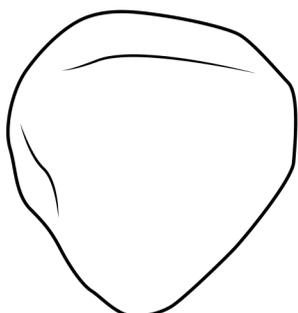
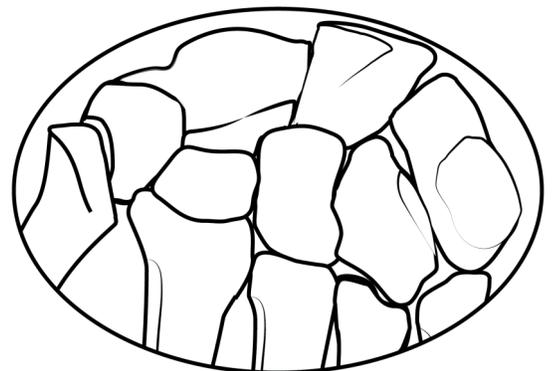


There are five different types of bones in your body because different bones have different jobs to do. Flat bones, like the one on the right, work as shields to protect internal organs. You find them in places like the skull, rib cage, and pelvis.



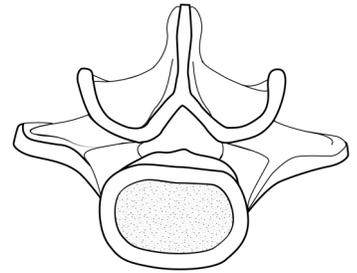
Long bones are designed to support weight and help you move. They include bones that make up most of the length of our arms and legs as well as bones in the fingers and other places.

Short bones are found in our wrists and ankles. They are about the same distance long as they are wide. They help stabilize these busy parts of our bodies and allow for movement.



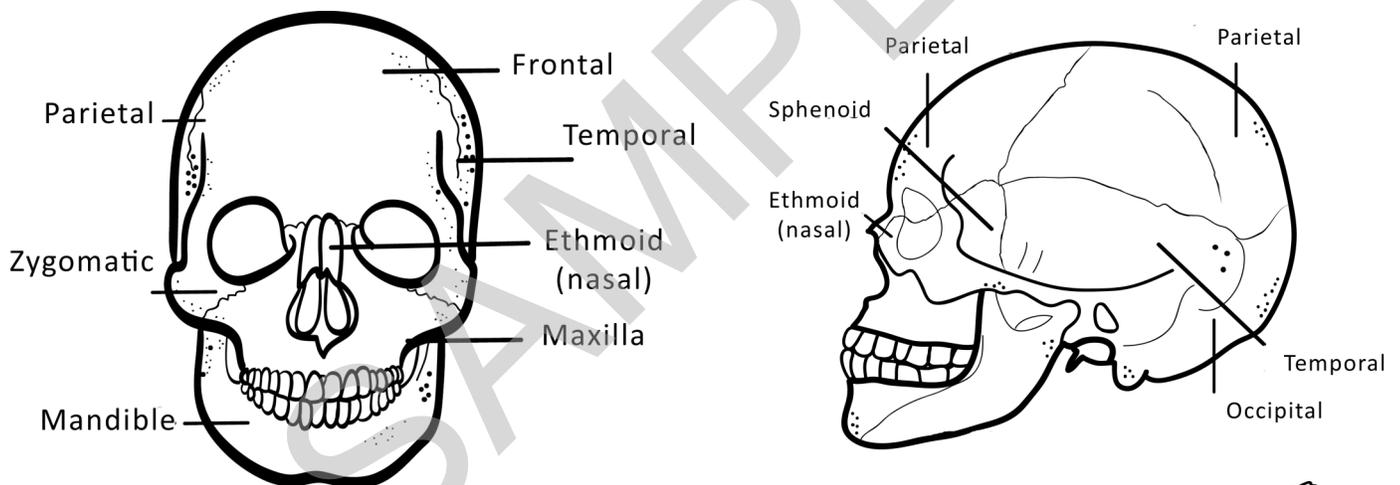
Sesamoid bones are found in tendons and help protect the tendons. The kneecap is a great example of a sesamoid bone.

There is also a group of irregular bones that don't fit any of the other categories but each have a special shape based on the job they need to do.

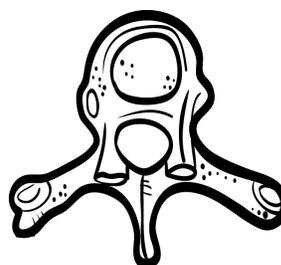


Now let's look closer at some specific bones throughout our bodies. We'll start at the top with our skulls. We have eight bones that have the job of protecting our brains. Those are the occipital, sphenoid, frontal, ethmoid, two temporal bones, and two parietal bones. Together, these bones are called **cranial bones**. The frontal bone is at our forehead, and the occipital is at the back of our skull.

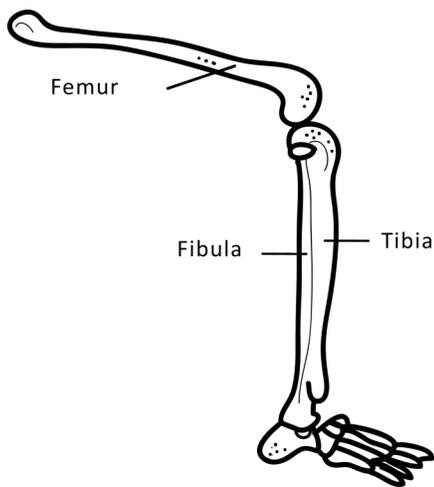
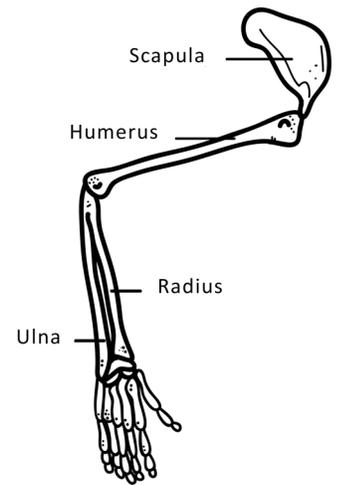
Our faces are made of fourteen bones. We won't diagram them all here, but it's interesting to know that of all the bones in our skull, only one can move. That's the **mandible**, our lower jaw. And it's a good thing it can move, or eating would definitely be a problem! The zygomatic bone is our cheekbone, and the maxilla is part of our jaw. The ethmoid bone is part of our nose.



Your backbone has 33 vertebrae in it, though some join together in adults. These bones protect your spinal cord. There are different types of vertebrae, and they differ in size depending on where they are in the backbone. Seven cervical vertebrae (below on left) make up the first section of your backbone. Beneath that are twelve thoracic vertebrae (below on right) that reach to the top of your lower back.

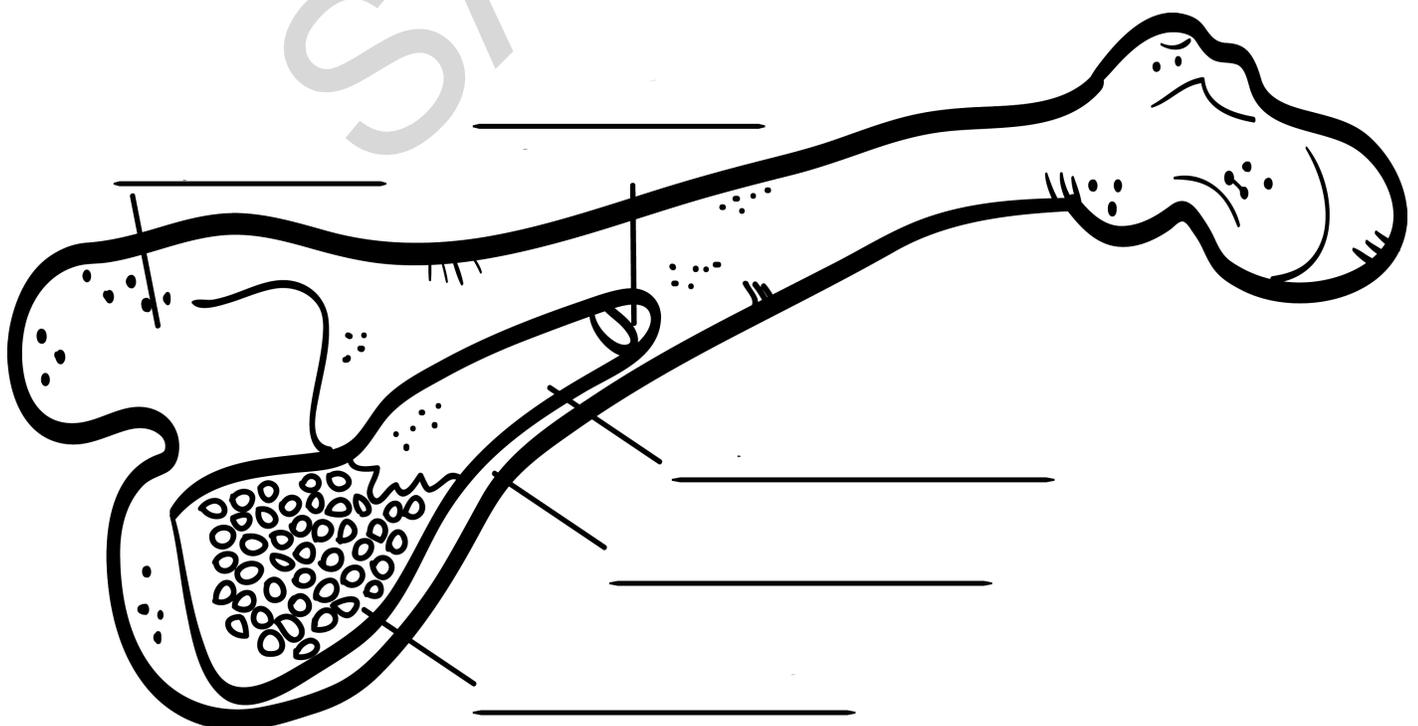


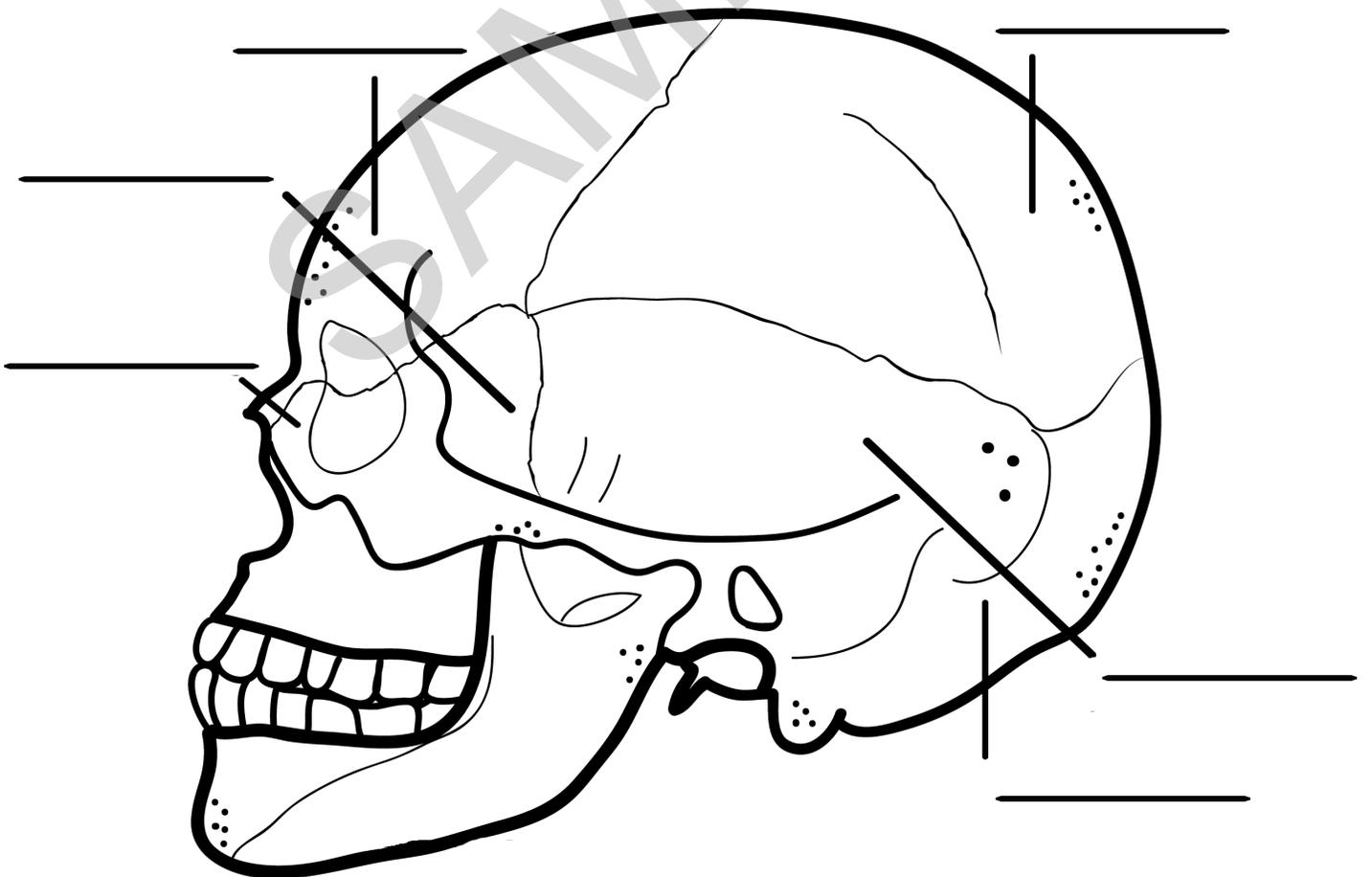
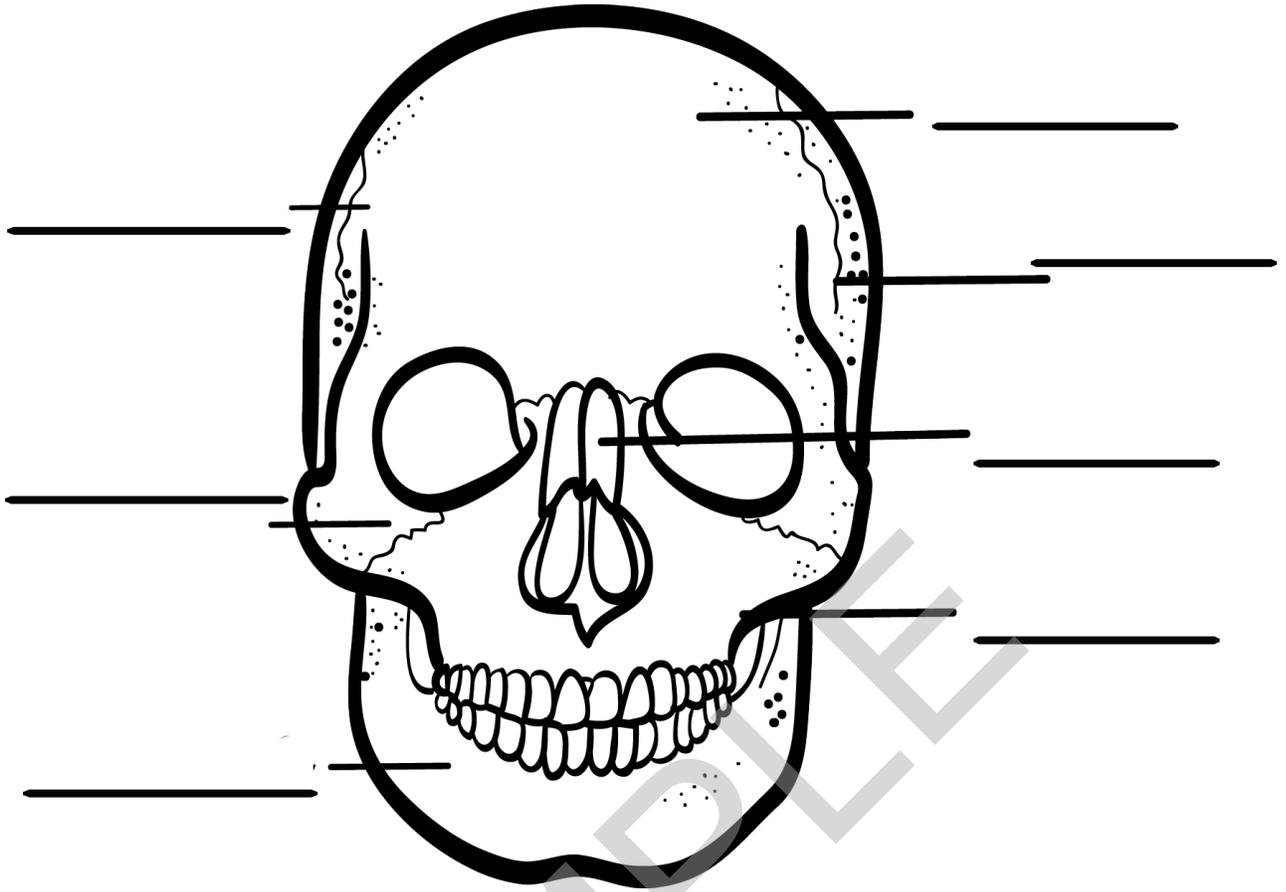
Each of our arms have four major bones. The scapula is the shoulder blade. The humerus is the bone of our upper arm. Technically, the humerus is the only bone in our arm because the arm is officially just the part between the shoulder and the elbow. Beneath that is the forearm, which is made of two bones, the radius and the ulna. If you hold your palm facing up, the ulna is the bone on the inside of your arm, nearest your little finger. The outside bone is the radius.

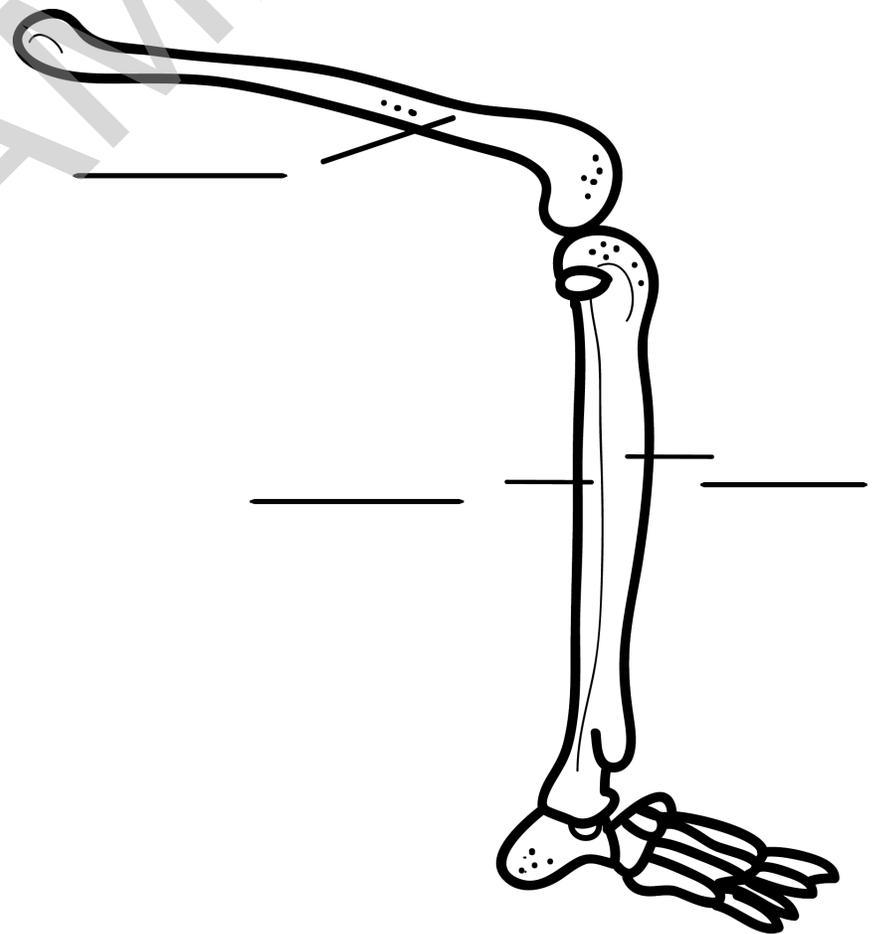
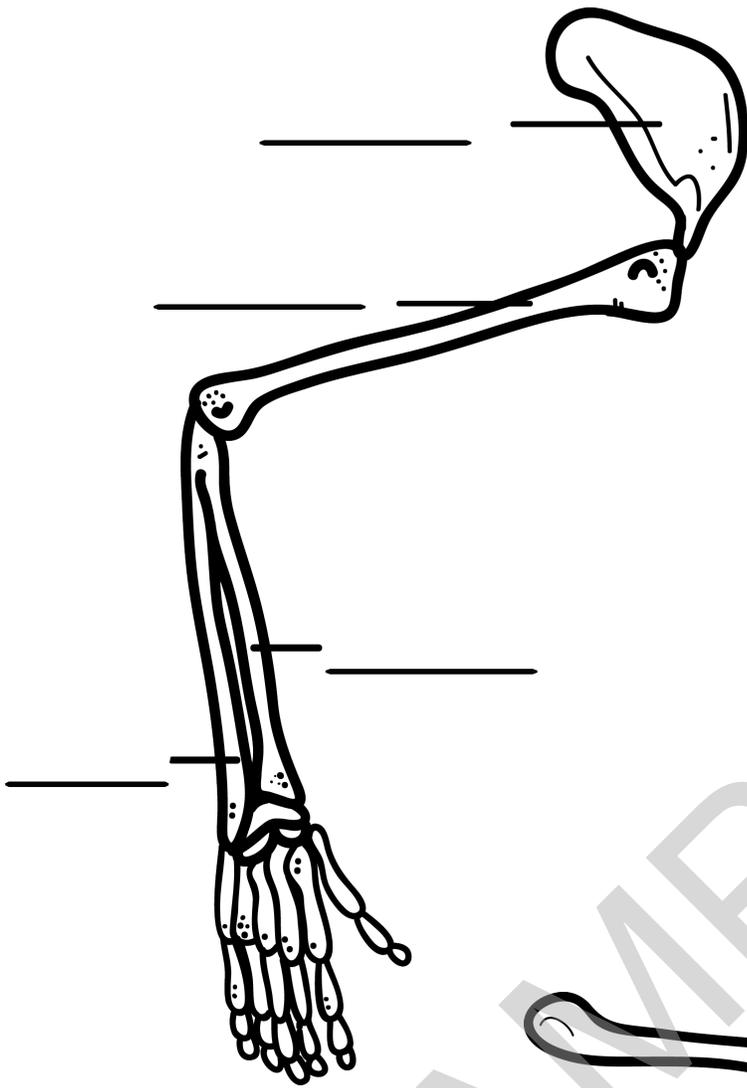


The leg is technically the section between the ankle and the knee. The section between the knee and hip is the thigh, though we often just call both together the leg. The thigh consists of the **femur** bone. The femur is the longest bone in the entire body. The tibia and fibula make up the bones of the leg. The tibia is also called the shinbone and can be felt at the front of the leg. You can feel your fibula at the side of your leg.

Before we take a closer look at the bones of our hands and feet, let's review the parts of bones and the names of the bones we've learned so far.







SAMPLE

# Terminology

Using what you learned, define these words in the best way you can. Use the back of the page if you need more room.

Compact bone: \_\_\_\_\_

Spongy bone: \_\_\_\_\_

Red bone marrow: \_\_\_\_\_

Yellow bone marrow: \_\_\_\_\_

Collagen: \_\_\_\_\_

Cranial bones: \_\_\_\_\_

Mandible: \_\_\_\_\_

Femur: \_\_\_\_\_

Opposable thumbs: \_\_\_\_\_

Carpals: \_\_\_\_\_

Metacarpals: \_\_\_\_\_

Phalanges: \_\_\_\_\_

Tarsals: \_\_\_\_\_

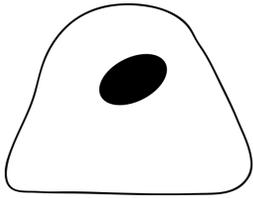
Metatarsals: \_\_\_\_\_

Clavicle: \_\_\_\_\_

Patella: \_\_\_\_\_

Simple fracture: \_\_\_\_\_

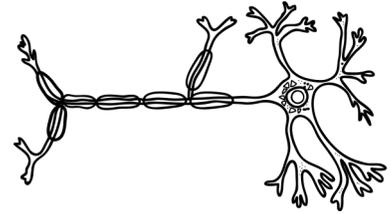
Which of the following is not a type of bone cell? Draw an X through it.



Osteoblast

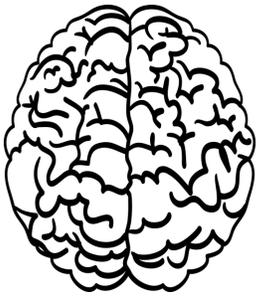


Osteoclast

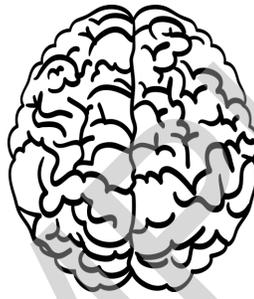


Neuron

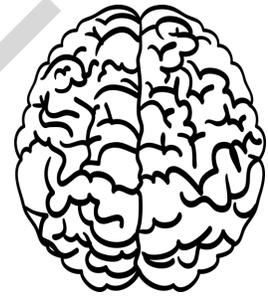
Which of the following is the largest part of the brain? Draw a circle around it.



Cerebrum



Hypothalamus



Cerebellum

Name four ways your body tries to prevent becoming infected with a virus or bacteria:


Name three of the seven types of bone fractures we discussed.

---