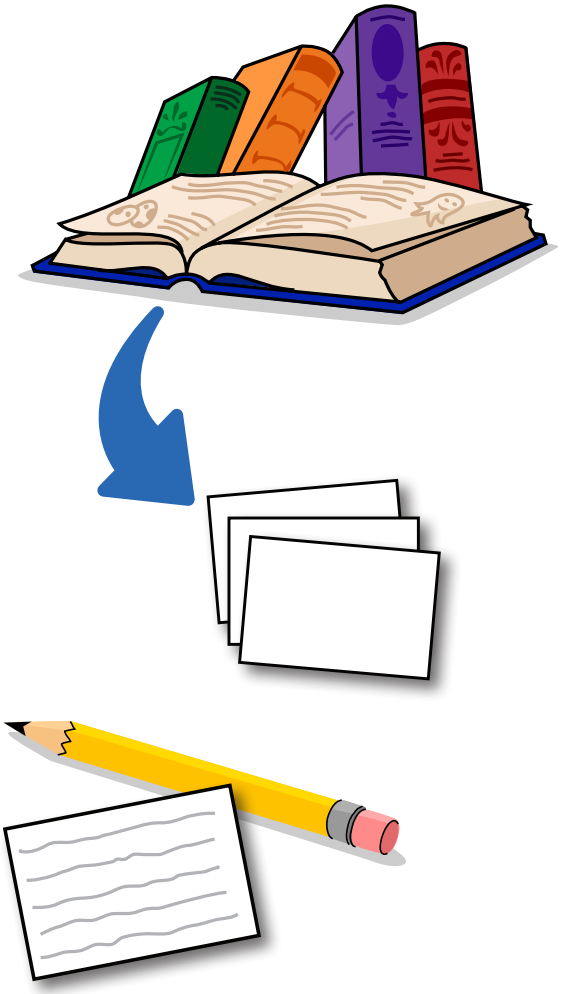
Biology Bits

Bite-size Science



Trying new things can be hard. When you play a new sport, you have to learn and remember a whole new set of rules. When you try new food, you may end up not liking it (and you may even wish you could spit it out). The same goes for school. Learning information can be really hard and sometimes scary.

With food, what's the best way to start with something new? Trying a very small piece. You can take a tiny bite…taste it, feel the texture of it, and decide if you want more. Just like with new food, new information can also be easier to learn if you start off with really tiny bites.

Biology Bits stories are a great way for you to learn about biology a little bit at a time. We've broken down information into pieces that are very tiny—bite-sized, we call them. You can try just reading the Biology Bits at first. Cutting out the cards will let you organize them however you want, or use them as flashcards while you read.

Then, when you're ready to move on, use the empty cards to write out what you learned. You can copy what was already written, or try to write it in your own words if you are up for a challenge. Just remember, don't bite off too much at once!

Busy Bones

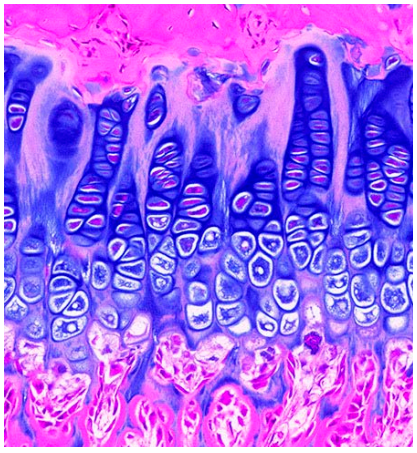
BB BITS

Written by Melinda Weaver

For more information on bones, visit:
http://http://askabiologist.asu.edu/busy-bones

This set of bits will teach you about the main organ system that gives your body its shape: **bones.**

Hungry for more bits? Visit:
http://askabiologist.asu.edu/activities/biology-bits



Growing bone viewed with a microscope.

The bones that you see on a skeleton look dry and dead. You might think that this is what the bones in your body look like. But the bones inside of you aren't dry and dead. They are made of living cells. These cells can change and fix themselves, just like your skin cells. This allows your bones to grow as you get bigger. It also lets them heal if they have been cracked or broken.

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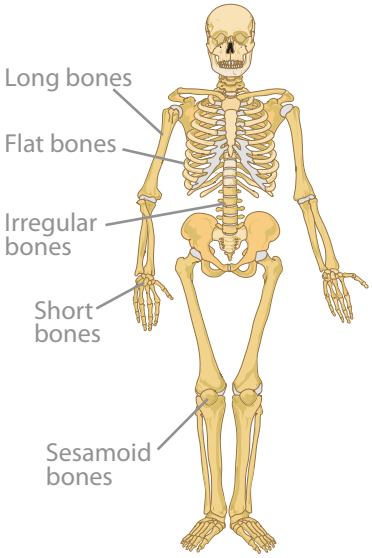
Most adults have 206 bones. Bones come in five shapes. Long bones help form your arms and legs. Short bones are short and fat, like your wrists and ankles. Flat bones, like your ribs, are flat and help protect your organs. Other bones have an odd shape, so we call them irregular bones. The bones that make up your spine are a good example of those. Some of your knee bones look like an arrowhead. We call those sesamoid bones.



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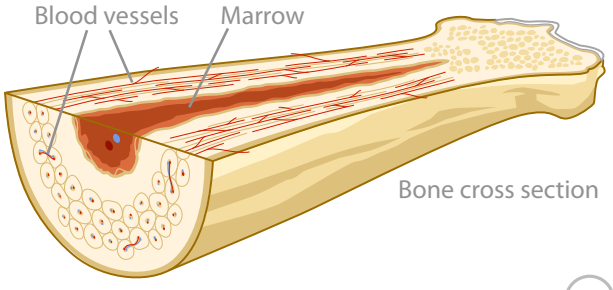
Bones aren't as solid as they look. Inside of bones there is a soft layer called bone marrow. All bone cells, including marrow, need food to live. Blood vessels run through this marrow to deliver cell food to the bone cells. The vessels also help move wastes away from the bone cells. There are two types of bone marrow: red and yellow. Red bone marrow is usually found in your flat bones, like your ribs. Yellow marrow is found in your long bones, your arm and leg bones.



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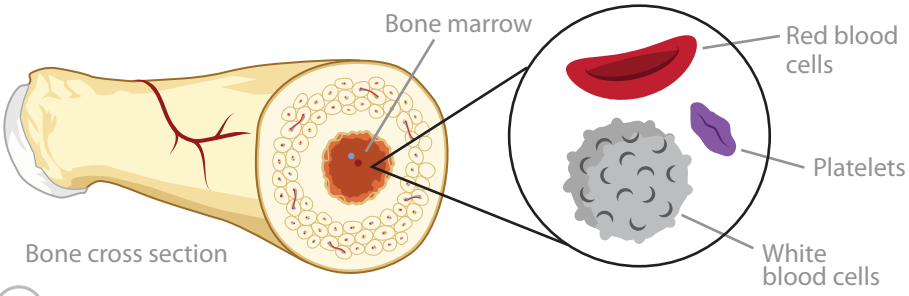
Red bone marrow is really important. It makes the red blood cells, white blood cells, and platelets you find in blood. Red blood cells carry oxygen around your body. White blood cells help attack germs and keep you from getting sick. Platelets help your blood clot when you get a cut. All of these cells are made in bone marrow.



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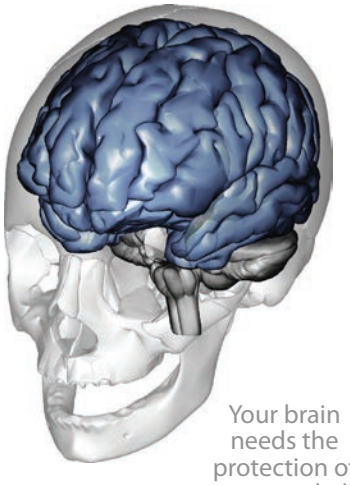
People say you should drink milk to make your bones strong. But why do you need strong bones? Bones are places where your muscles can attach. This makes it possible for you to move. If you are walking, climbing, or sitting up straight, you are using your bones. Bones also protect you. For example, your skull protects your brain, and your ribs protect your heart and lungs. Bones also store fat and minerals your body can use later.



Your brain needs the protection of a strong skull.

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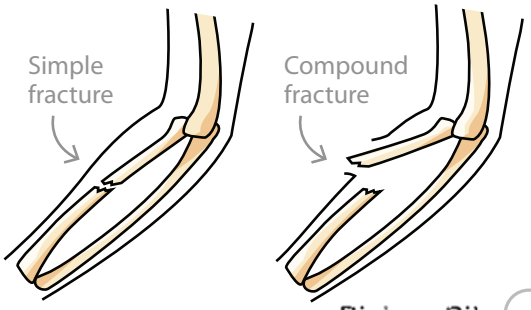
Bones are strong. They support you all the time. But sometimes bones can break. This can be from a sudden hit or it can happen if they are used too much. Athletes that work out too much can have problems like these. Bones can also become sick and weak as you get older, or if they don't get the right nutrients. When a bone breaks, it can break two main ways. If the break stays under your skin, it's a simple fracture. If bone breaks through your skin, it's a compound fracture.



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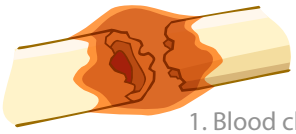
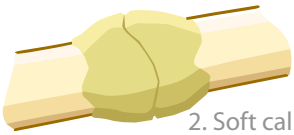
Steps of Bone Healing



1. Blood clot



2. Soft callus

3. Hard callus

When your bone breaks, you should go to a doctor to get it fixed. But your bones also work to heal themselves. Right after your bone breaks, platelets in the red bone marrow clot around the break. That clot forms a callus, which covers up the break like a scab covers a cut. After 6 -12 weeks, the callus gets harder and bigger. This makes the bone stronger. During the next few years, the extra bone will be removed by special cells. It can take up to nine years for your bone to return to normal.

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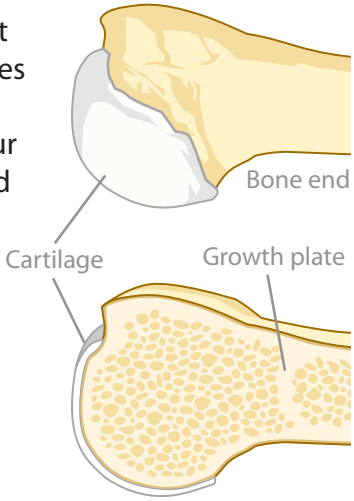
You are born with around 300 bones. But most adults have 206. Many of your bones join together to form larger, stronger bones. When you are young, most of your bones are made of cartilage, like you find in your ears and the tip of your nose. As cartilage grows, it can harden and turn into bone. Your bones also grow with you by growing at the ends in areas called "growth plates." When you are done growing, growth plates become solid and stop bone growth.



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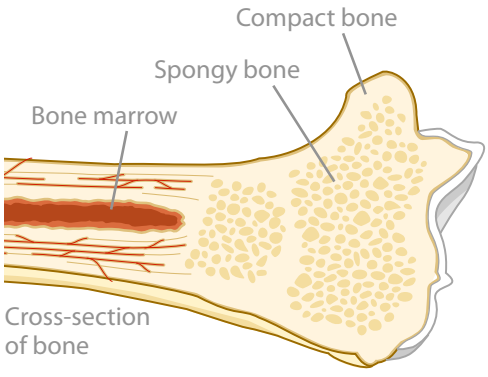
Your bones are made of three types of bone tissue: compact, spongy, and marrow. Almost 80% of your bone is compact bone. This top layer of bone is the toughest. It is strong enough to support you when you move. Spongy bone is found at the ends of your bones. It has more open sections called pores, so it looks a bit like a sponge. The inside of the bone is filled with bone marrow. This is where blood cells are made.



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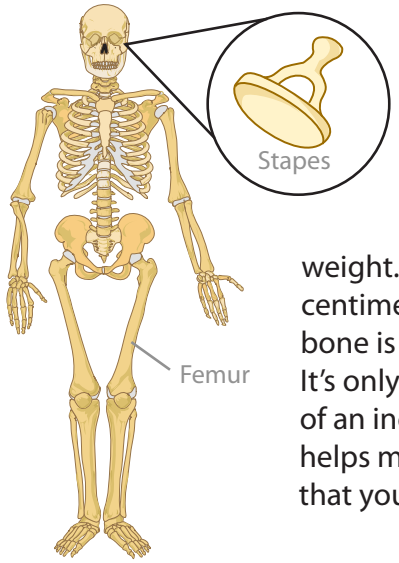

The largest bone in the human body is the femur. It starts at your hip and goes all the way to your knee. It's thick and strong because it supports your body weight. In the average adult, it's about 50 centimeters (20 inches) long. The smallest bone is your stapes, found in your inner ear. It's only a tiny 3 millimeters (just over a tenth of an inch). But it has an important role. It helps move vibrations through your ear so that you can hear sounds.

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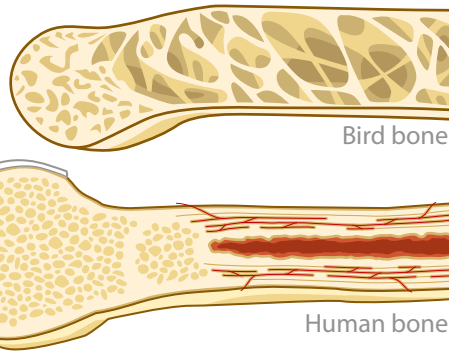
Your bones are strong and dense, but not all animals are the same. Bird bones have a lot more empty space than human bones. This makes them lighter so it's easier to fly. The outside of the bones look the same as ours. But they don't have bone marrow inside. Other animals, like insects and worms, don't even have bones.



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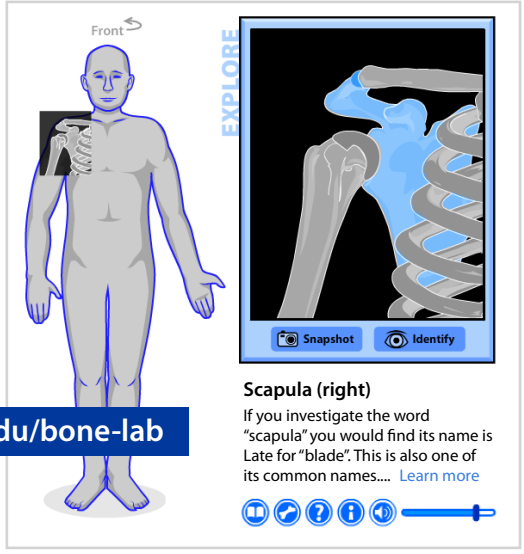
Which bones are found in your forearm? What do they look like on the inside? And what would happen if one of those bones broke? Explore the human skeleton and cut open bones to see what's inside at:

http://askabiologist.asu.edu/bone-lab



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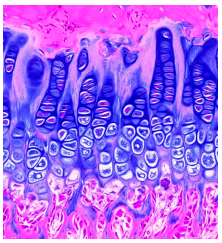

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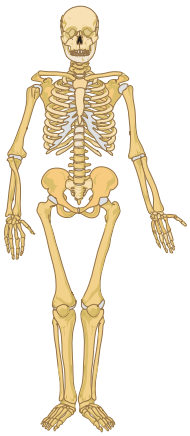

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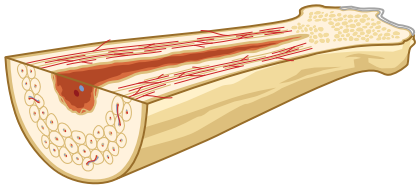

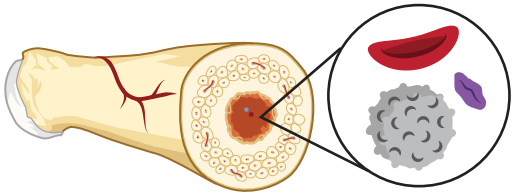

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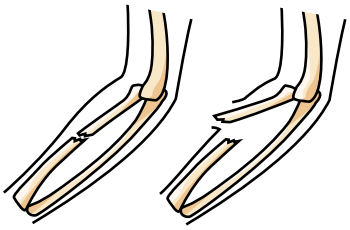

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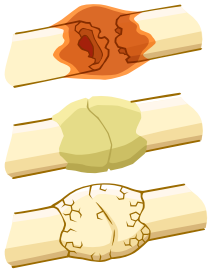

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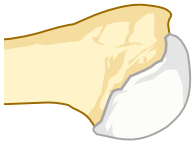

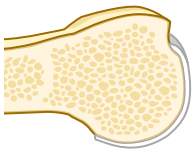

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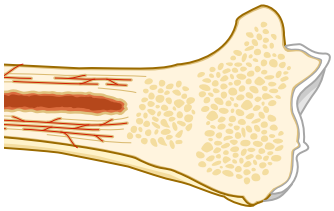

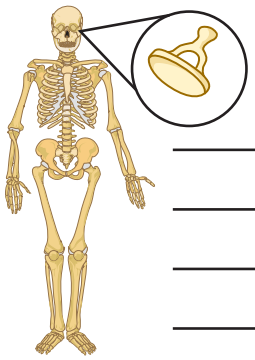

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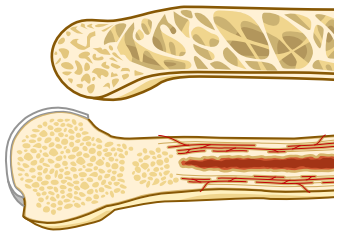

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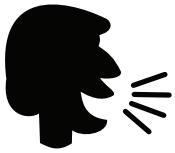

How do you say?

Irregular – [ear-**reg**-you-ler]
Sesamoid – [**ses**-uh-moid]
Marrow – [mare-oh]
Platelet – [**plate**-lit]
Mineral – [**min**-er-uhl]
Nutrient – [**new**-tree-ent]
Callus – [**kal**-uhs]
Cartilage – [**car**-till-edge]
Spongy – [**spun**-jee]

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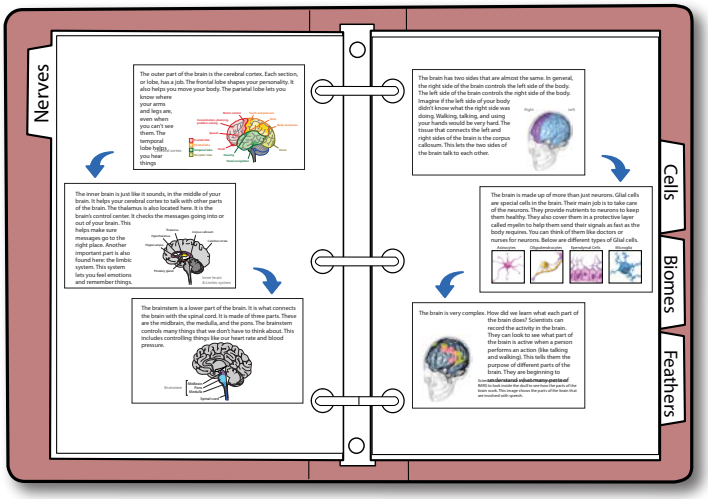

Instructions

Ready to begin? You can use these bits in many ways. You can print the pages and place them in a notebook for review. You can also cut each card out to re-organize them any way you want.

The empty cards can be used to write out what you learned in your own words, or to copy what's already written. Also included is a pronunciation guide, to help you learn how to say the more complicated words.

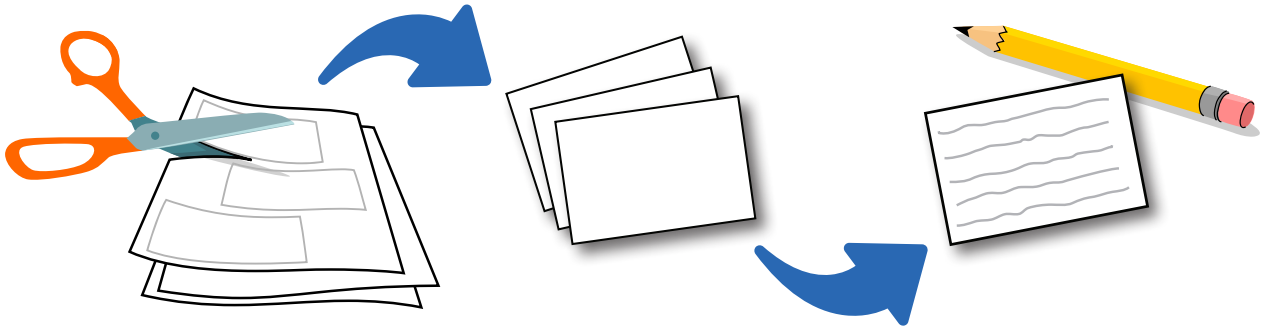

Illustration Credits

Jeff Kerr - *via Organization*
- Microscopic view of growing bone

Gustavo Castaneda - *via Ask A Biologist*
- Red blood cell, white blood cell and platelet cell

Sabine Deviche - *via Ask A Biologist*
- All other images