Bone is a dynamic, living tissue - not the hard, dry, lifeless frame seen in scary movies or desert scenes or even on a pirate flag. About 30% of bone is living tissue, cells, and blood vessels - the tissues that make your bones grow. The blood vessels go in and out of the bone carrying oxygen and nutrients, and taking away wastes. Bones contain marrow which produces red blood cells and white blood cells. Bones have nerves that can feel pressure and pain. Bones even help us hear! About 45% of bone is mineral (primarily calcium and phosphorus), giving bone its hardness and rigidity and storing these minerals for future use. Bone releases some of this mineral when other body parts, such as nerves, may need them. Bone also contains the proteins, collagen and elastin. Finally, about 25% of bone is made up of water.

Bone tissue consists of compact bone (cortical or solid bone) and spongy bone (trabecular or cancellous bone). Compact bone is made up of structural units called Haversian systems. The system is composed of concentrically arranged layers of hard inorganic matrix surrounding a microscopic central Haversian canal. Blood vessels and nerves pass through the canal. Spongy bone is like a network of hardened bars with spaces between them filled with marrow.

Bone tissue is made and maintained by several types of cells: osteoblasts, osteocytes, and osteoclasts. Osteoblasts make new bone by hardening the protein, collagen, with minerals. Osteocytes maintain bone, passing nutrients and wastes back and forth between the blood and bone tissues. Osteoclasts destroy bone, releasing minerals into the blood. All through life, bone is continually being reconstructed and reshaped.

A baby has very soft bones made up of cartilage. As the infant grows, the cartilage is replaced by calcium (ossification). When a person reaches the age of 20 or so, the bones stop getting longer or bigger, but there is still a lot of growing going on. Old bone cells dissolve and are replaced by new bone cells. Because bone keeps growing, your body is able to repair any breaks that may occur.

Bone is made up of a hard outer "shell" consisting of compact bone. Tendons, ligaments, and other parts attach to this shell by way of the bone's covering, the periosteum. Inside the compact bone is a looser network of spongy bone containing marrow. There are 206 bones in the human body, making up our skeletal systems. Over half of them are in the wrists, ankles, hands, and feet! The skeletal system provides a strong framework for the body giving our body its shape, and permits us to stand upright. It supports and protects vital internal organs such as the brain and heart. It provides a point of attachment for muscles and connective tissue (ligaments, tendons, cartilage) and certain bones, connected at flexible joints, form a combination of levers that allow coordinated movement.
Bones may be classified into four groups: long bones, flat bones, short bones, or irregular bones. (These groups are discussed in Activity 2F.) Long bones are strong shafts made of compact bone tissue with the ends consisting of spongy tissue covered with compact tissue. Their slightly curved shafts enable them to absorb shock. Flat bones provide broad surfaces to protect other structures and for anchoring muscles. They are broad flat plates of spongy tissue sandwiched between two layers of compact tissue. Short bones are strong, irregular cubes, made of spongy bone covered with compact tissue. Irregular bones are shaped differently enough that they cannot be grouped with the other three types of bones. Their proportion of spongy to compact tissue varies from bone to bone.