Objectives
To identify the role of the skeletal system
To recognize that different strategies are used throughout the animal kingdom for support of tissues and structures.
To label the major bones of the human body.
To explain the significance of the osteon and the associated cells that contribute to making bone and cartilage.
To understand the repair process when a bone breaks.
To be aware of the reasons for osteoporosis.

Role of the Skeletal System
Supporting Framework for the Body

Types:
Hydrostatic: Made of fluid e.g. Jellyfish
Exoskeleton: External e.g. Insects
Endoskeleton: Internal e.g. Vertebrates

Example of Hydrostatic Skeleton
Sea Anemone

Example of Exoskeleton
Arthropods, such as this Sally lightfoot crab, have armorike skeletons on the outside of their bodies.

Function of Vertebrate Skeleton
- Supports the body
- Site of muscle attachment
- Protects the internal organs
- Locomotion
- Produce Red Blood Cells
- Storage site for calcium and phosphorous
- Inner ear bones involved with hearing
Special Functions of Skeleton

Some animals have unique adaptations for the skeletal system, such as the bat which uses its phalanges or finger bones for support of its wings.

Interesting facts about the Human Skeleton

Composed of 206 bones
Largest bone is the femur (leg bone)
Smallest bones are the inner ear bones.

Endoskeletons

Difference between axial & appendicular skeletal elements.

Structure of Bone

Bone is made of an outer layer of compact bone and spongy bone inside.
The osteon includes a central canal containing a capillary which nourishes the osteocytes, embedded in the concentric rings of bone material.

Cells associated with skeletal system

Osteoblasts: Bone forming cells
Osteocytes: Mature bone cells
Osteoclasts: Bone dissolving cells.
Osteon: Circular bone unit. Contain Osteocytes and blood vessels for supporting living tissue.

Composition of Bone

Collagen – A fibrous connective tissue, made of protein material.
Protein material is a “triple” helix
Bone is further hardened by minerals:
- Calcium
- Phosphate
**Cartilage**

*Connective tissue* that forms portions of the skeleton; consists of *chondrocytes* and collagen (protein matrix).

Found in inter-vertebral discs, outer ear and nose, support of trachea and at the distal ends of long bones.

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**Chondrocytes**

- Living cells of cartilage.
- Secrete collagen.
- Matrix is chondrin
  - Strong
  - Flexible

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**Synovial Joints**

Bones are separated by a fluid-filled cavity, padded with cartilage, and held together by dense connective tissue i.e. ligaments.

Different synovial joints have different movements

- Ball-and-socket joints (shoulder)
- Gliding joints (wrist and ankles)
- Hinged joints (elbows and knees)

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**Osteoporosis**

Osteoporosis is an insidious form of bone loss. It means “porous bones.”

After age 35 the activity of the osteoclasts exceeds the osteoblasts and bone density declines.

Women are 8 times more likely to suffer from osteoporosis. The estrogen connection.
Prevention of Osteoporosis

- Diet rich in calcium
- Weight bearing exercise.
- Reduce or stop smoking.
- Decrease consumption of Alcohol and acidic drinks.

>>> Be ACTIVE!