Functions of the Bones

- Support
- Protection
- Movement
- Storage
- Blood cell formation

Classification of Bones by Type

- Compact
  - Dense
  - Smooth and homogeneous
- Spongy
  - Small needlelike pieces of bone
  - Lots of open space
Classification of Bones by Shape

- Long bone
  - humerus of arm
- Short bones
  - carpals of wrist
- Flat bone
  - parietal bone of skull
- Irregular bone
  - vertebra

Compact Bone

- Haversian system (osteon)
  - Haversian canal
  - Lamellae
  - Lacunae
  - Osteocyte
  - Canaliculi
Haversian System

Bone Formation, Growth, and Remodeling

- Ossification - process of bone formation
- Osteoblasts - bone-forming cells
- Osteoclasts - bone-destroying cells

Bone Formation — Overview
Repair of Bone Fractures

Stage 1. Hematoma formation
Stage 2. Fibrocartilage callus formation
Stage 3. Bony callus formation
Stage 4. Bone remodeling
Divisions of Adult Skeleton

- Axial
- Appendicular
Axial Skeleton
- Skull
- Middle ear bones
- Vertebrae
- Hyoid bone
- Ribs
- Sternum

The Skull
- Cranium
- Facial bones
Skull Bones

- Frontal
- Parietal
- Temporal
- Occipital
- Sphenoid
- Ethmoid
- Maxillae
- Palatine
- Zygomatic
- Lacrimal
- Nasal
- Vomer
- Mandible
Bones of the Middle Ear

- Malleus (hammer)
- Incus (anvil)
- Stapes (stirrup)

The Infant Skull

- Fontanels
  - Anterior (frontal)
  - Sphenoid
  - Posterior (occipital)
  - Mastoid

Regions of Vertebral Column

- 7 cervical vertebrae in neck region form cervical curvature.
- 12 thoracic vertebrae form thoracic curvature. Ribs attach here.
- 5 lumbar vertebrae in small of back form lumbar curvature.
- Sacrum: 5 fused vertebrae in adult form pelvic curvature.
Vertebrae

- Cervical (7)
  - Atlas
  - Axis
- Thoracic (12)
- Lumbar (5)
- Sacral (5 fused)
- Cocygeal (4 vestigial)
  - Coccyx
Ribs

- “True” ribs (7 pairs)
  - Costal cartilage
- “False” ribs (5 pairs)
  - “Floating” ribs (2 pairs)
- Sternum (breastbone)

Appendicular Skeleton

- Shoulders
- Arms
- Hips
- Legs

Bones of the Upper Skeleton
Shoulder and Arm

- Clavicle - collarbone
- Scapula - shoulder blade
- Humerus - upper arm
- Radius - lateral lower arm
- Ulna - medial lower arm
- Carpals - wrist bones
- Metacarpals - palm bones
- Phalanges - finger bones
Pelvis

- Ilium
- Ischium
- Pubis
- Pubic symphysis
- Pubic arch
- Sacrum

Male vs Female Pelvis

- Male
  - Narrow, funnel-shaped
  - Coccyx curves forward
- Female
  - Wide, shallow, and basin-shaped
  - Coccyx more vertical
Hip and Leg

- Pelvis - hip bone
- Femur - upper leg
- Patella - kneecap
- Tibia - medial lower leg
- Fibula - lateral lower leg
- Tarsals - ankle bones
- Metatarsals - bones of sole
- Phalanges - toe bones
Joints

Functions
- Hold bones together
- Give skeleton mobility

Classification
- Functional
- Structural

Classification of Joints by Function
- Immovable
- Slightly movable
- Freely movable

Classification of Joints by Structure
- Fibrous joints
  - Sutures of skull
- Cartilaginous joints
  - Intervertebral joints
- Synovial joints
  - Elbows and knees
Types of Synovial Joints

- Ball and socket
  - hip
- Hinge
  - elbow
- Pivot
  - atlas and axis
- Gliding
  - foot

Inflammatory Disorders of Joints

- Arthritis
  - Osteoarthritis
  - Gouty arthritis
  - Rheumatoid arthritis
Osteoporosis

Normal Bone | Osteoporotic Bone

The End