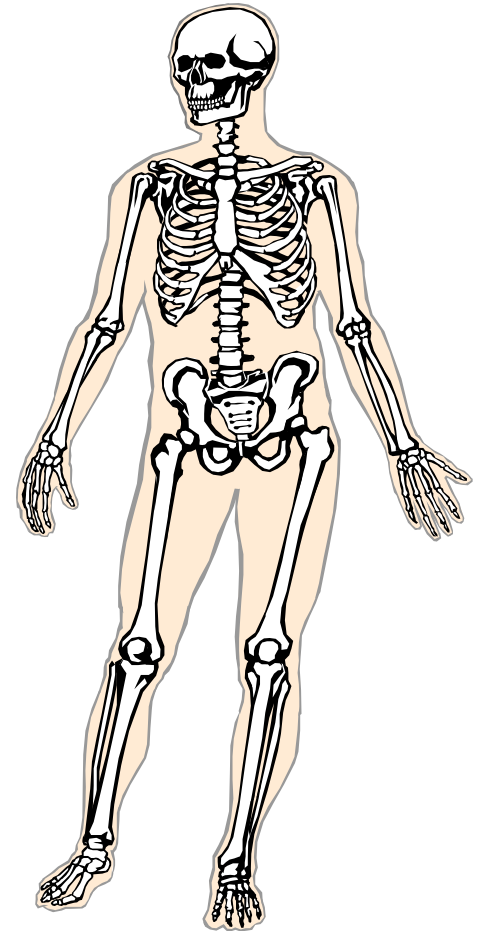
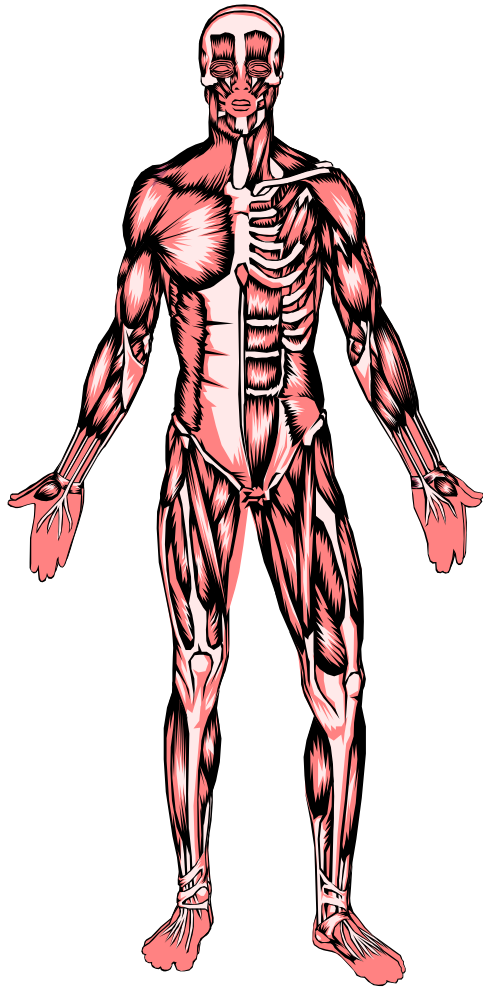
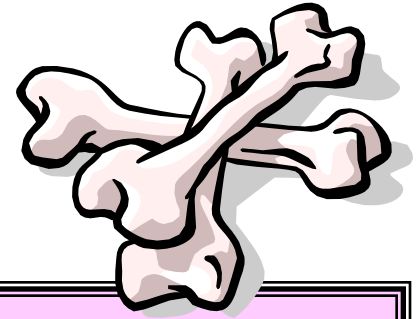


THE MUSCULOSKELETAL SYSTEM



Objectives



After studying this chapter, you will be able to:

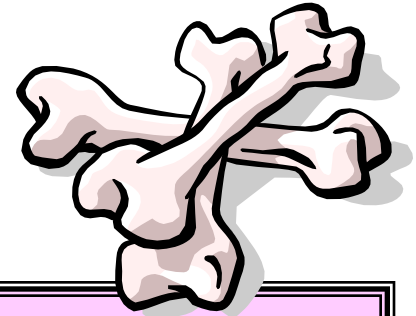
- **Name the parts of the musculoskeletal system and discuss the function of each part.**
- **Define combining forms used in building words that relate to the musculoskeletal system.**
- **Identify the meaning of related abbreviations.**

Objectives CONT'D



- **Name the common diagnoses, laboratory tests, and clinical procedures used in treating the musculoskeletal system.**
- **Define the major pathological conditions of the musculoskeletal system.**

Objectives CONT'D



- **Define surgical terms related to the musculoskeletal system.**
- **List common pharmacological agents used in treating the musculoskeletal system.**

Structure & Function

Forms the body framework

Enables the body to move



Protects and supports internal organs

Consists of bones, joints and muscles

Structure & Function

Bones

- **Composed of osseous tissue**
- **Consists of a rich supply of blood vessels and nerves**
- **Osteoblasts are bone-forming cells**
- **Osteoclasts are responsible for reabsorbing dead bone tissue**
- **Bone cells are called osteocytes**

Structure & Function

Bones

The development of osteocytes and the hardening process is called **ossification**.

Ossification depends on:

calcium

phosphorus

vitamin D

Structure & Function

Bones

The adult skeleton has 206 bones.

Common Bone Categories

- **Long bones**
(Femur)
- **Short bones**
(Wrist bones)
- **Flat bones**
(Skull)



- **Irregular bones**
(Vertebrae)
- **Sesamoid bones**
(Kneecap)

Structure & Function

Bones

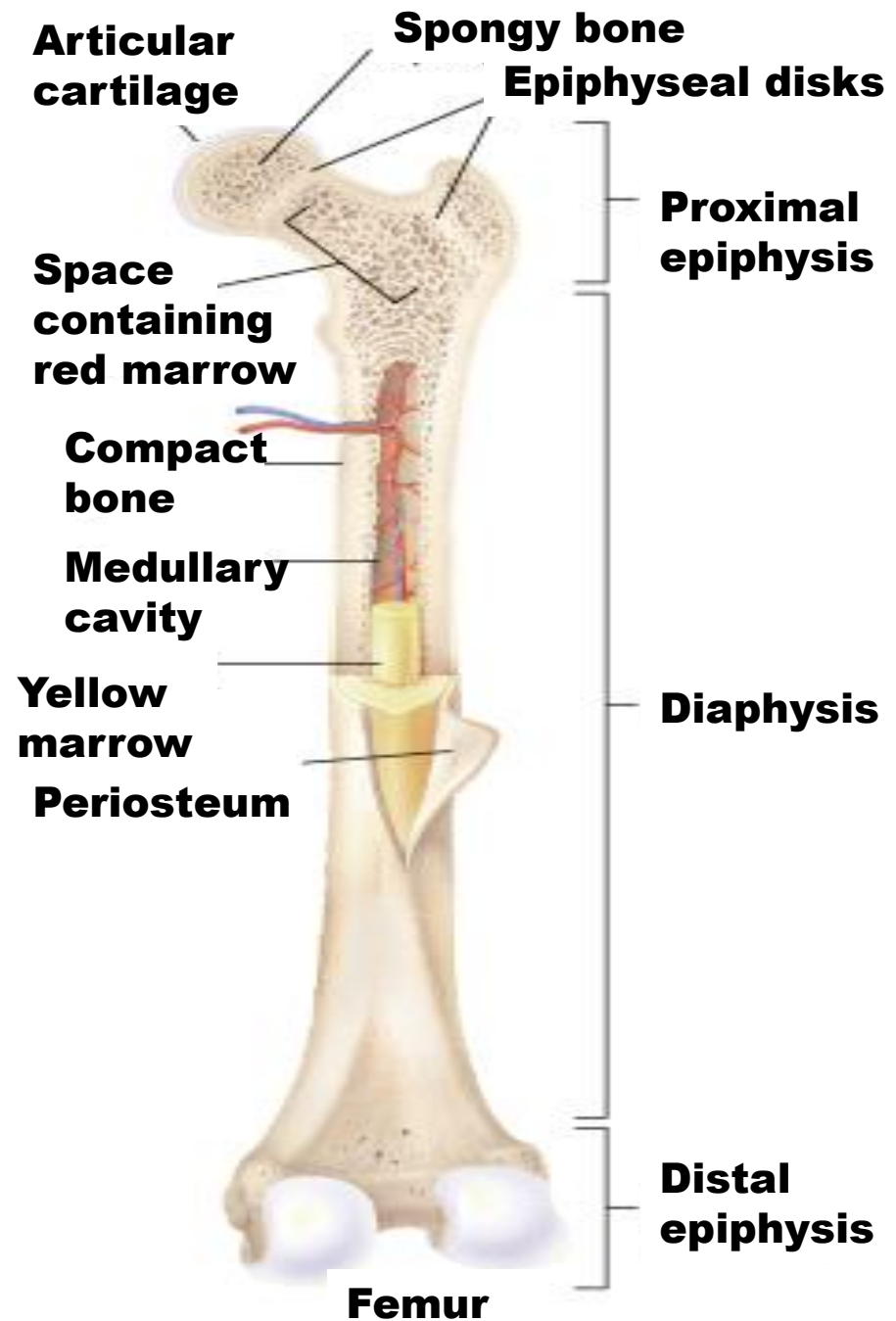
Parts of long bones:

- The shaft is the longest portion also called the **diaphysis**.
- The ends are called the **epiphysis**.
- Space between the epiphyses and the diaphysis is called the **metaphysis**.

Structure & Function

Parts of a long bone

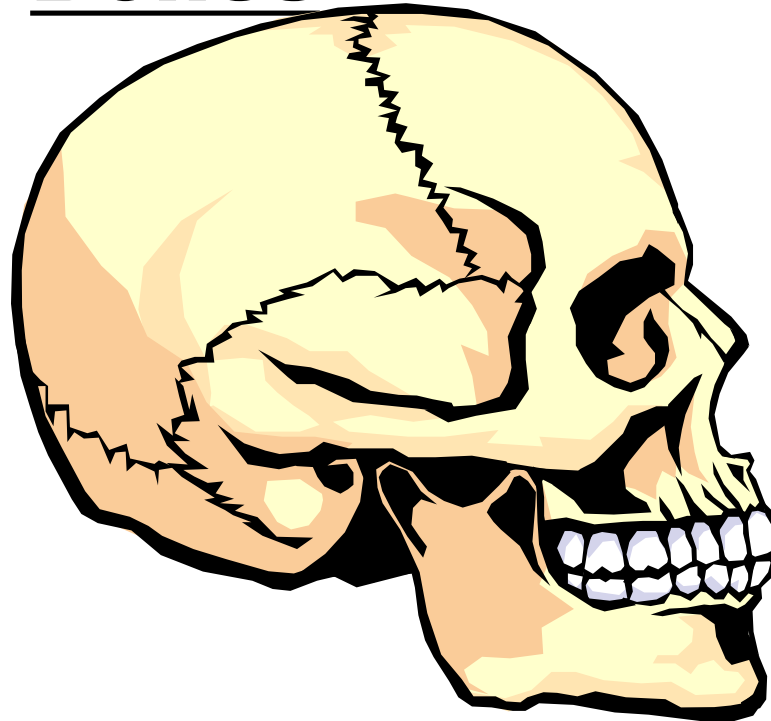
- **Articular cartilage** is a thin flexible substance that provides protection at movable points.
- **Medullary cavity** contains yellow bone marrow.
- **Red bone marrow** is found in infant bones and the flat bones of adults.



Structure & Function

Cranial Bones

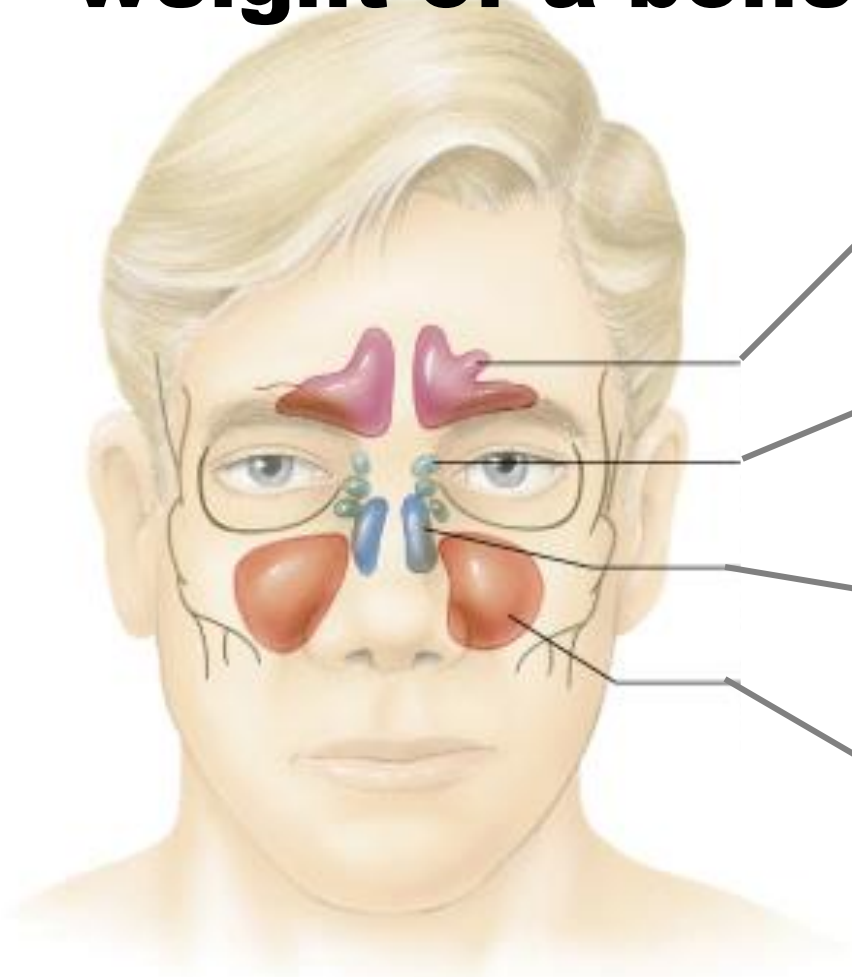
- **Temporal**
- **Frontal**
- **Sphenoid**
- **Occipital**



- **Parietal**
- **Ethmoid**

Structure & Function

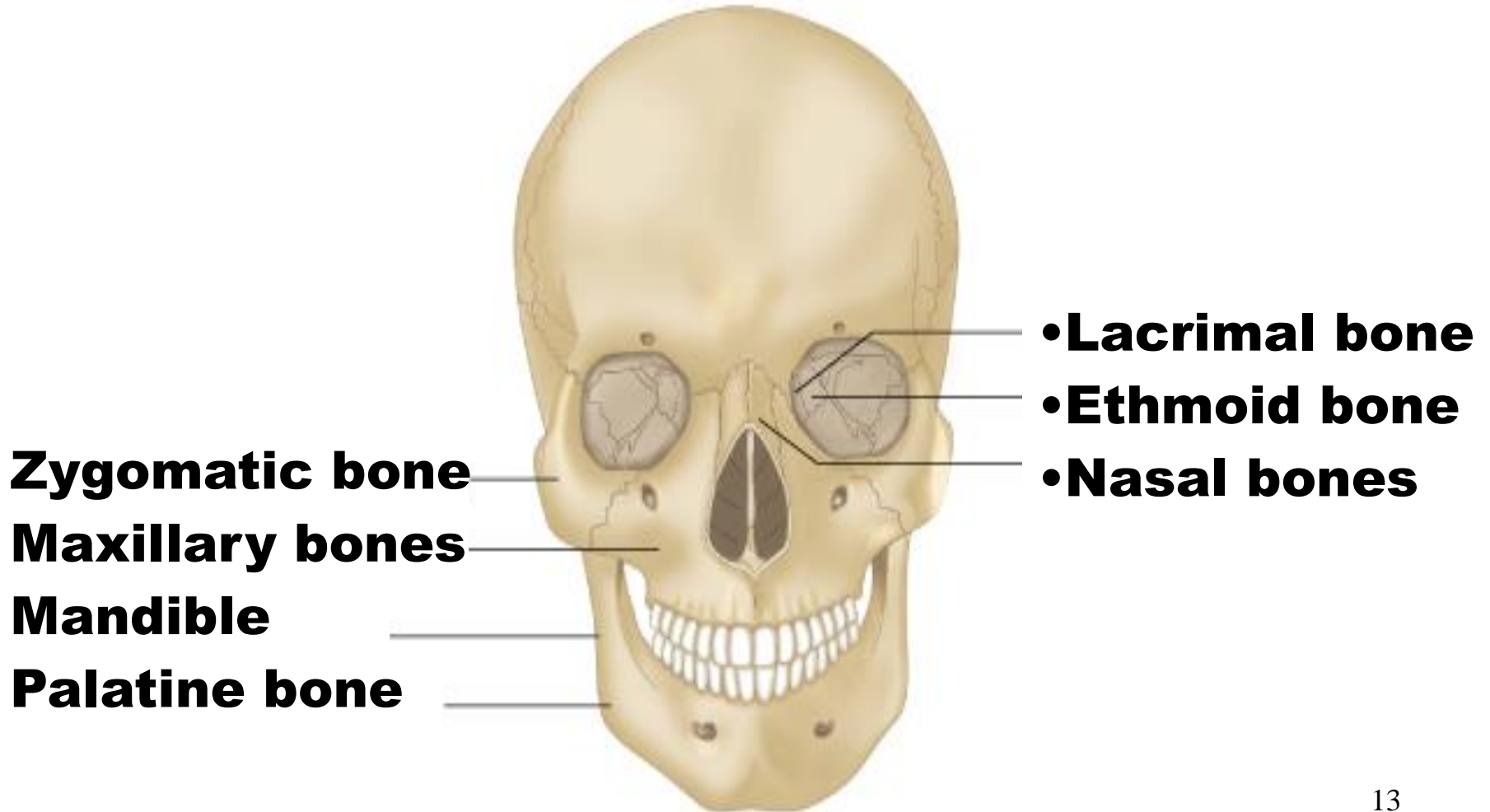
Sinuses are cavities that reduce the weight of a bone.



- **Frontal sinuses**
- **Ethmoid sinuses**
- **Maxillary sinuses**
- **Sphenoid sinuses**

Structure & Function

Facial Bones



Structure & Function

Spinal Column

Consists of five sets of vertebrae

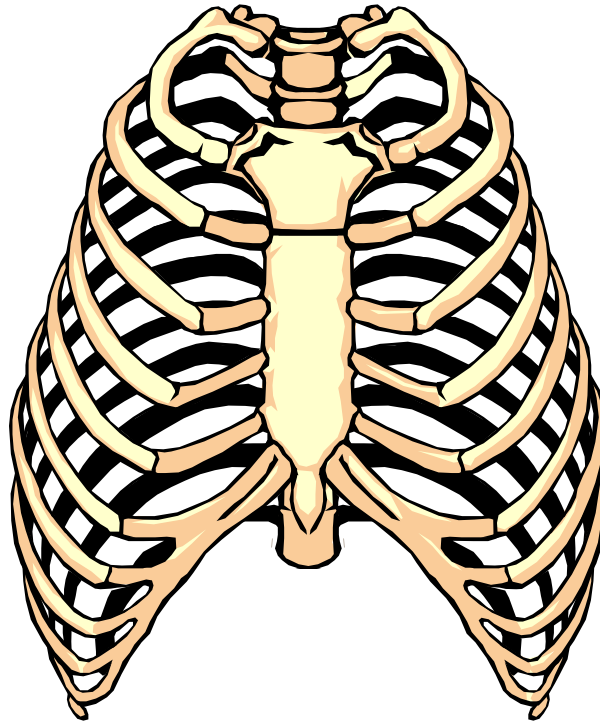


- **Cervical = 7**
- **Thoracic = 12**
- **Lumbar = 5**
- **Sacrum = 5**
- **Coccyx = 1**

Structure & Function

Bones of the Chest

- **Clavicle**
- **Scapula**
- **Sternum**

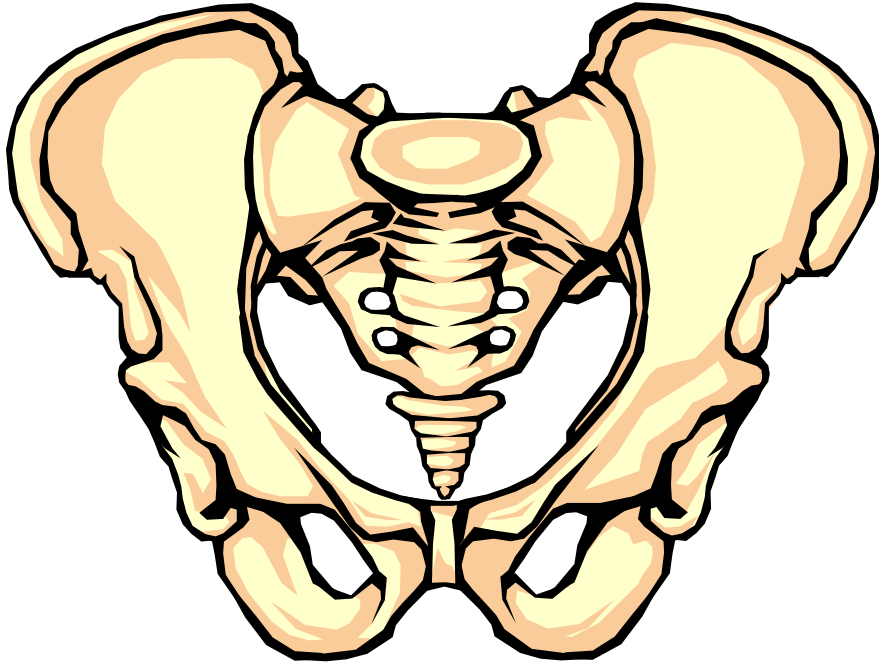


- **True ribs**
- **False ribs**
- **Floating ribs**

The chest cavity is also referred to as the **thoracic cavity.**

Structure & Function

Bones of the Pelvis



- **ilium**
- **ischium**
- **pubes**
- **pelvic cavity**

The pubic symphysis is where both pubic bones join.

Structure & Function

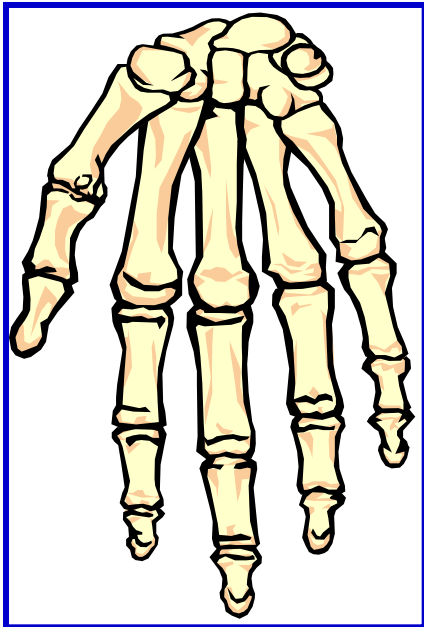
Bones of the Extremities

Upper Arm

- **Humerus**

Lower Arm

- **Ulna**
- **Radius**



Hand and Fingers

- **Carpals (wrist)**
- **Metacarpals (palm)**
- **Phalanges (fingers)**

Structure & Function

Bones of the Extremities (Cont'd)

Upper Leg

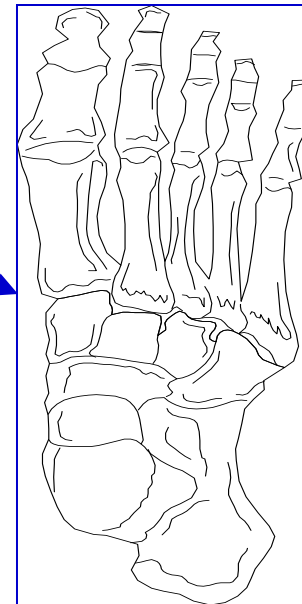
- **Femur**

Lower leg

- **Tibia (shin)**
- **Fibula**
- **Patella (kneecap)**

Feet and Toes

- **Tarsals**
- **Calcaneus (heel)**
- **Metatarsals**
- **Phalanges**



Structure & Function

Amphiarthroses

- Moves slightly

Diarthroses

- Moves freely

**Joints
(articulations)**

Synarthrose

- No movement

Structure & Function

Tendons and Ligaments

Tendons are bands of fibrous tissue that connect muscles to bone.

Ligaments connect bones to other bones.

A joint lubricator (**synovial fluid**) helps synovial joints move easier.

Movement occurs at joints with the assistance of **muscles**, tendons and ligaments.

Structure & Function

Muscles

Muscles contract (shorten) and extend to provide body movement.

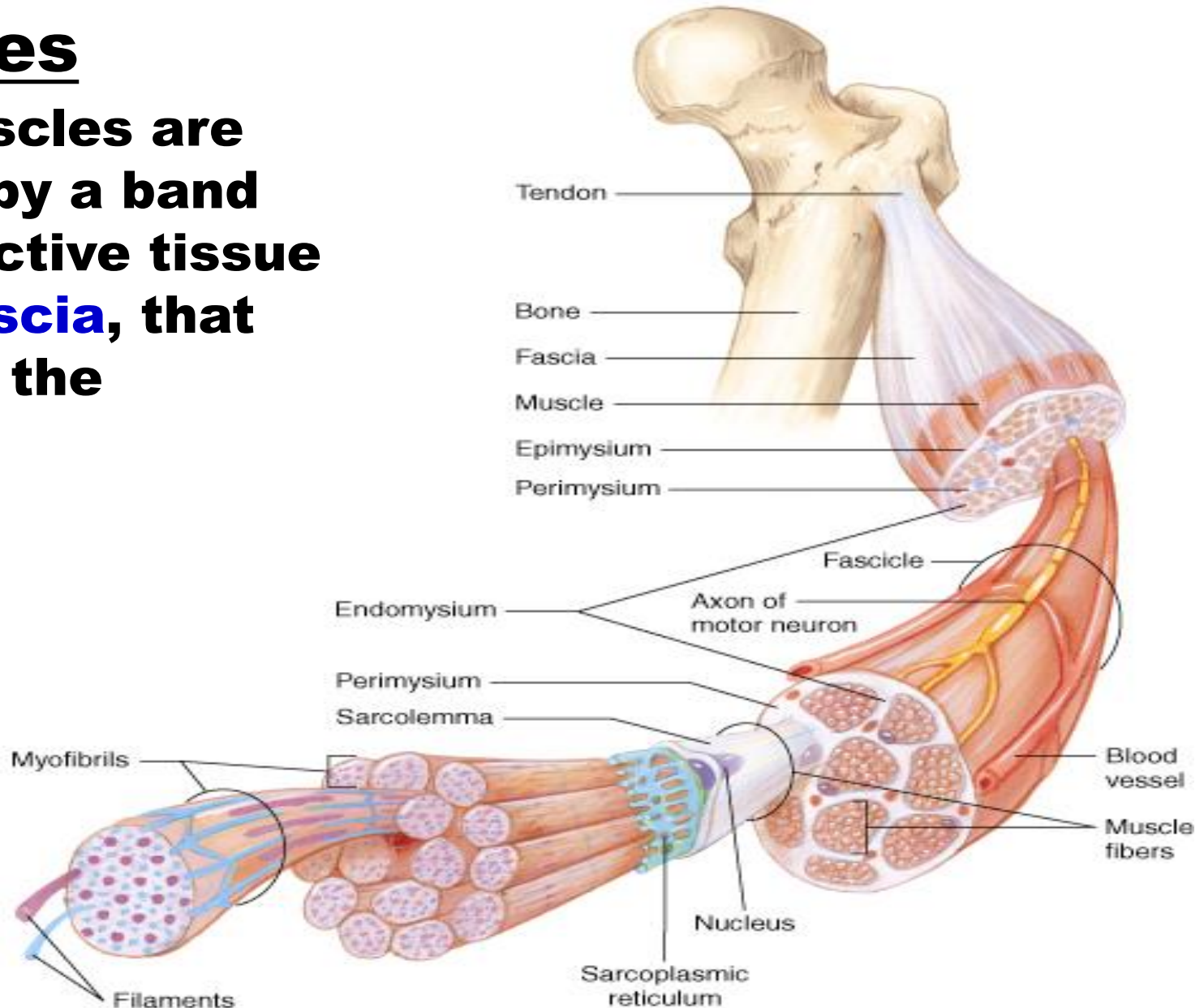
Types of Muscles

- **Voluntary (skeletal)**
- **Involuntary (smooth or visceral)**
- **Cardiac**

Structure & Function

Muscles

Most muscles are covered by a band of connective tissue called **fascia**, that supports the muscle.



Lift up your right forearm to flex your bicep brachii as if making a fist. Identify the origin and insertion attachment by agreeing with one of the following statements:

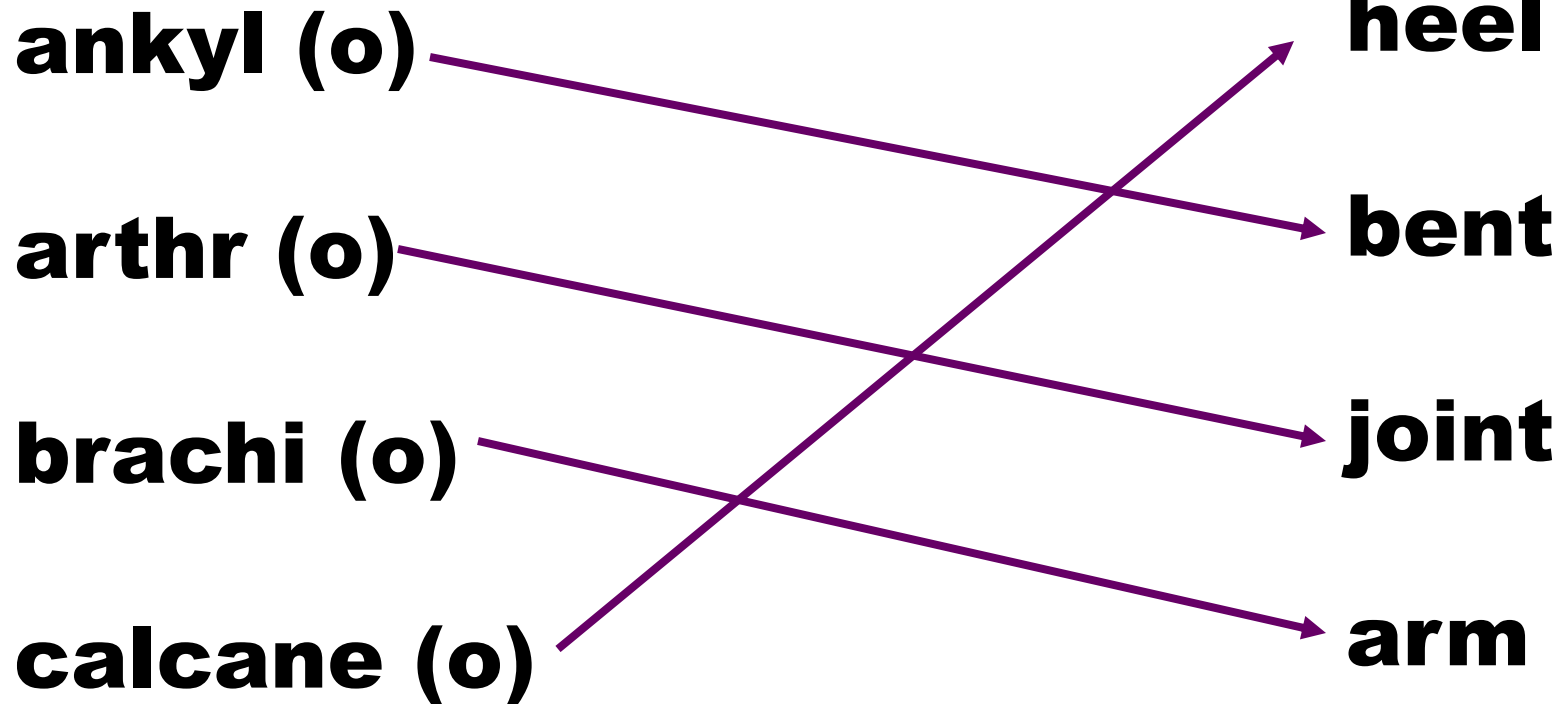
The radius is the *origin* and the scapula is the *insertion*.

---OR---

The scapula is the *origin* and the radius is the *insertion*.

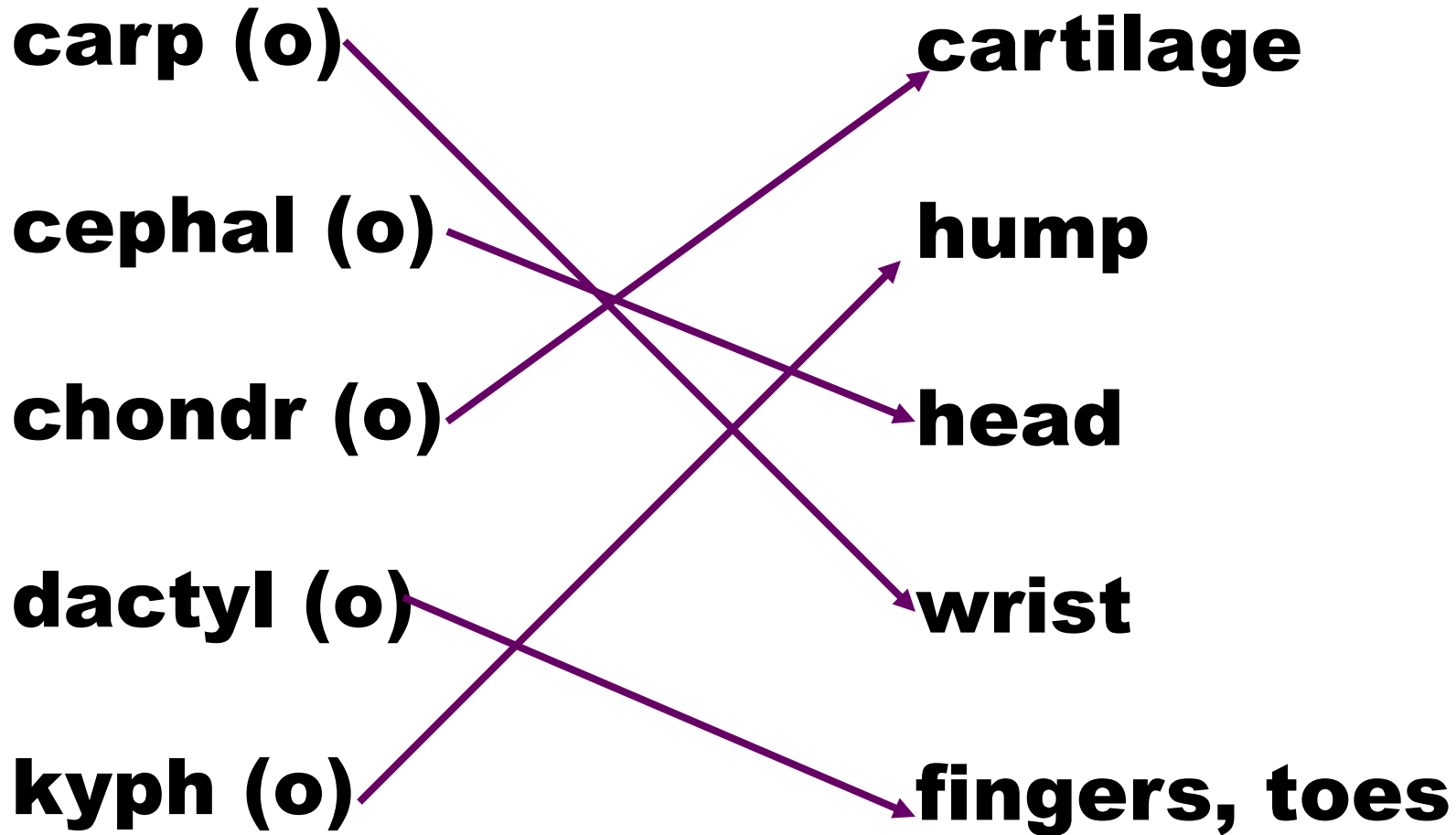
Combining Forms

Match the following combining forms and meanings.



Combining Forms

Match the following combining forms and meanings.



Combining Forms

Match the following combining forms and meanings.

my (o)

myel (o)

pod (o)

oste (o)

phalang (o)

foot

finger or toe bone

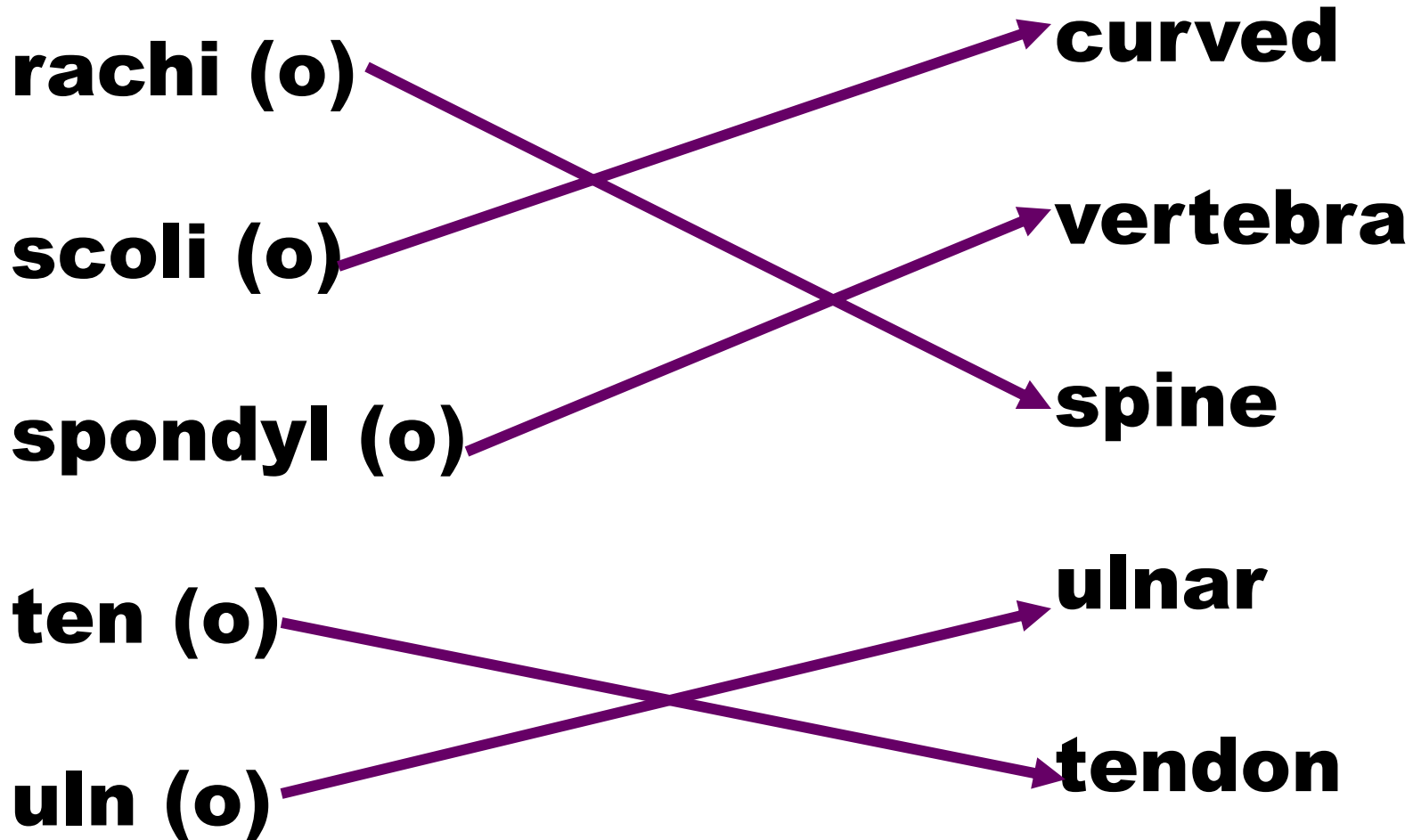
muscle

bone

spinal cord; bone marrow

Combining Forms

Match the following combining forms and meanings.



Diagnostic, Procedural, and Laboratory Tests

Medical specialists that treat disorders of the musculoskeletal system:

• **Orthopedists**

• **Podiatrists**

• **Osteopaths**

• **Chiropractors**

• **Rheumatologists**

Diagnostic, Procedural, and Laboratory Tests



Performing internal examinations or the use of x-rays, scans, and radiographs are often required to diagnose bone and muscle ailments.

Diagnostic, Procedural, and Laboratory Tests

- **Arthrography**

- **Arthroscopy**

- **Diskography**

- **Computed tomography (CT)**

- **Myelography**

- **Electromyogram**

- **Magnetic resonance imaging (MRI)**

Diagnostic, Procedural, and Laboratory Tests

Laboratory tests measure the levels of substances found in some musculoskeletal disorders.

Common laboratory tests

- **Rheumatoid factor test**

- **Creatine phosphokinase (CPK)**

- **Calcium**

- **Phosphorus**

- **Uric acid**

Diagnostic, Procedural, and Laboratory Tests

Other Tests

Goniometer
-Tests for ROM

Densitometer
-Measures
bone density



Goniometer

Pathology

Causes of musculoskeletal disorders

- **Birth defects**
- **Injury**
- **Degenerative disease**
- **Systemic disorders**

Pathology

Types of fractures



Complex



Incomplete



Comminuted



Greenstick



Simple (closed)



Compound (open)



Colles'



Impacted

Pathology

- **Injury or trauma to the joints or muscle may cause a sprain.**
- **Overuse of a muscle may cause a strain.**

Other conditions:

• **Tendinitis**

• **Dislocation**

• **Subluxation**

• **Osteoporosis**

Pathology

Musculoskeletal Pain and Discomfort

- **Osteoalgia**
- **Myalgia**
- **Arthralgia**
- **Arthritis**
- **Tetany**

Surgical Terms

Almost any major part of the musculoskeletal system can now be surgically repaired.

Supportive devices

• **Cast**

• **Traction**

• **Splints**

• **Prosthetic devices**

Surgical Terms

Reduction is the return of a part to its normal position.

Osteoplasty is repair of a bone.

Tenotomy is the cutting into a tendon to repair a muscle (**myoplasty**).

Arthroplasty is repair of a joint.

Laminectomy is removal of part of a spinal disk.

Pharmacology



Most medications treat symptoms and not the cause of musculoskeletal discomfort.

Pharmacology



Common medications for the Musculoskeletal System

- **Analgesics**
- **Steroids**
- **Muscle Relaxants**
- **NSAIDS**

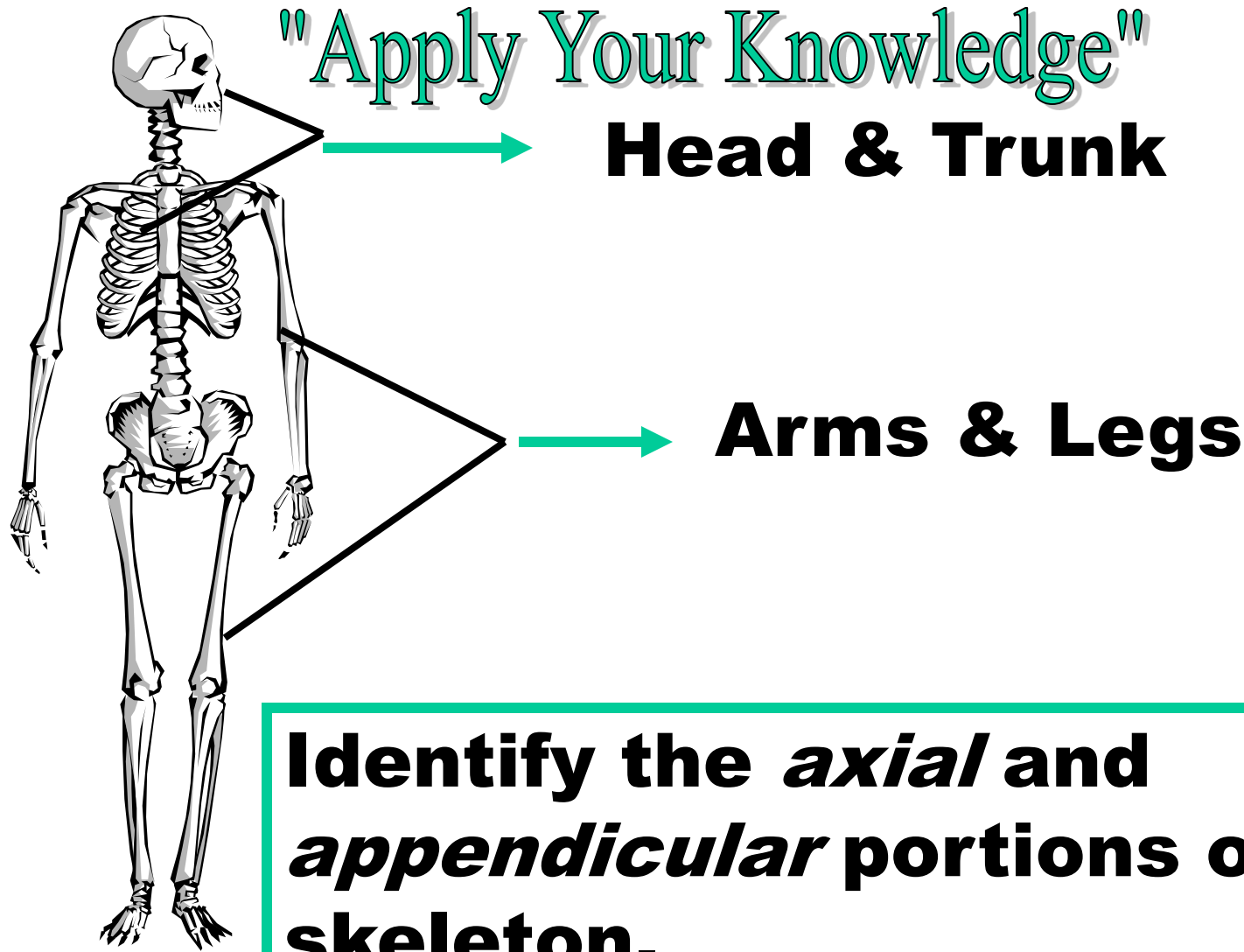
"Apply Your Knowledge"



Mrs. Jones is concerned with the “soft spots” she feels on her baby’s head. You realize the medical term for these “soft spots” is:

- A. Fontanelle**
- B. Fissure**
- C. Foramen**

A. Fontanelle



Identify the *axial* and *appendicular* portions of the skeleton.

"Apply Your Knowledge"

Mary is complaining of headache, stuffy nose and pressure with facial discomfort. Her physician tells her she has allergies. Which of the following conditions might she be experiencing?

- A. fracture of her vomer**
- B. sinusitis**
- C. stroke**

B. sinusitis

"Apply Your Knowledge"



Relieves pain



Reduces swelling



Relieves stiffness

A. steroids

B. analgesics

C. muscle relaxants

Match the correct medication with its action.