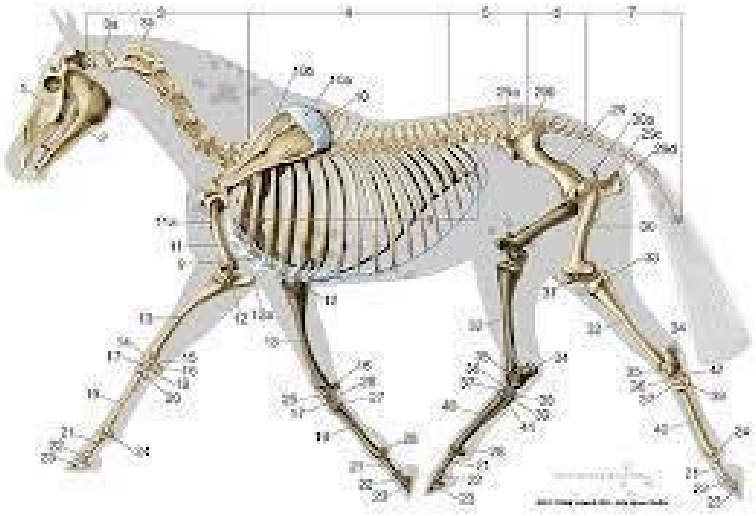
Chapter 17: Structure and Movement

Section 1 The Skeletal System



All the bones in your body make up your **skeletal system,** which has five major functions.

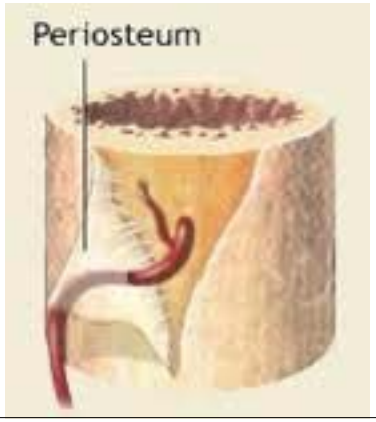
1. Your skeleton gives shape and support to your body.
2. Your bones protect your internal organs.
3. Major muscles are attached to your bones.
4. Blood cells are formed in the marrow in the center of your bones.
5. Calcium and phosphorus compounds are stored in your skeleton for later use.

Bone structure

Periosteum—a tough, tight-fitting membrane that covers the bone's surface

a. Contains small blood vessels that carry nutrients into the bone

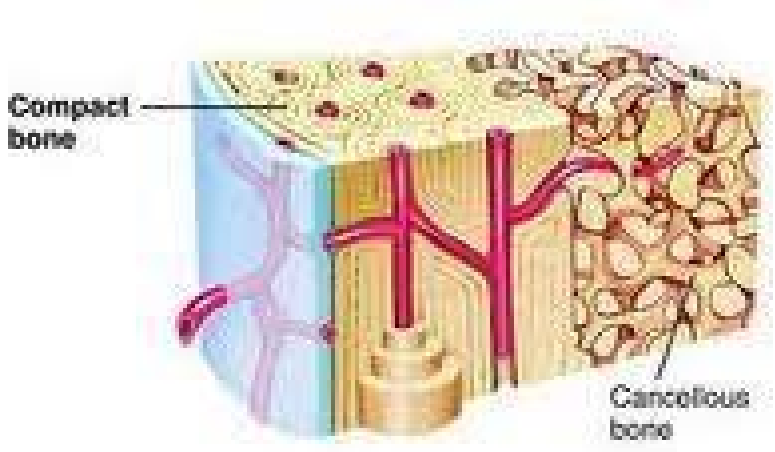
b. Contains cells involved in the growth and repair of bone



Compact bone—the hard, strong layer under the periosteum

a. Gives bone its strength

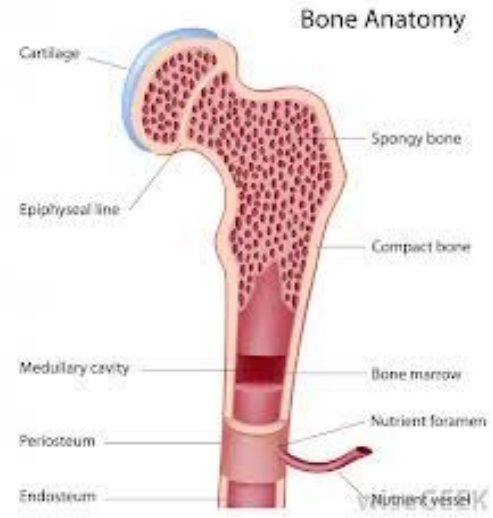
b. Has a framework containing deposits of calcium phosphate



Spongy bone—found toward the ends of long bones

a. Has many small, open spaces that make bones lightweight

b. Filled with marrow, which produces blood cells



Cartilage—a rubbery layer of tissue found at the ends of bones, where they form joints

a. Cartilage acts as a shock absorber and reduces friction between bones when they rub together.

b. People with damaged cartilage feel pain when they move their joints.

Your skeleton begins before birth as cartilage, which is gradually broken down and replaced by bone.

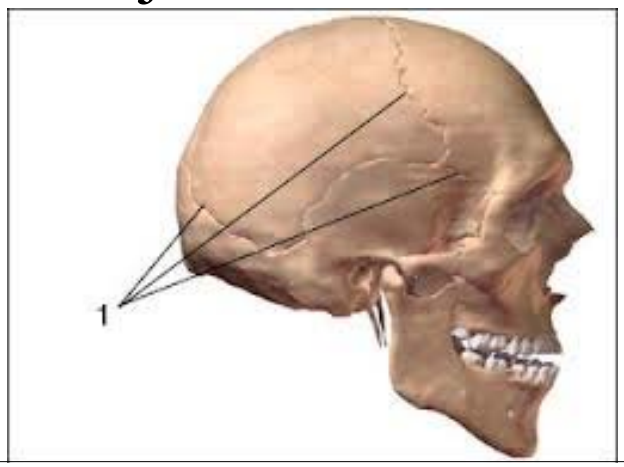
1. Healthy bone tissue is always being formed and re-formed.
2. Osteoblasts build up bone by depositing calcium and phosphorus, which make bone tissue hard.
3. Osteoclasts break down bone tissue.

Joints—any place where two or more bones come together

1. Bones must be kept just far enough apart so they don't rub against each other.
2. **Ligament**—a tough band of tissue that holds bones in place

Types of joints

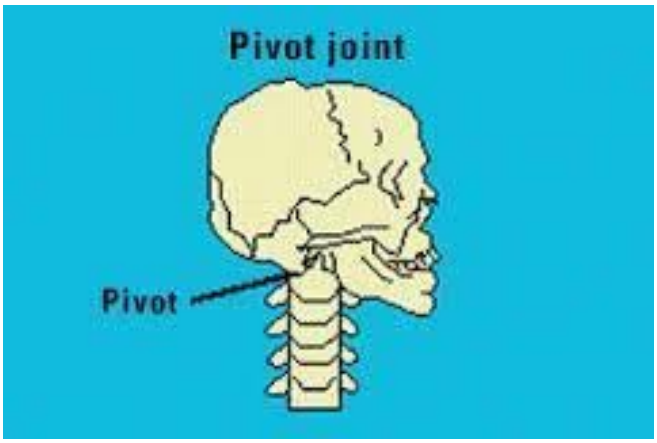
1. Immovable joint
   a. Allows little or no movement
   b. Example: the joints of the bones in your skull



Pivot joint

a. One bone rotates in a ring of a stationary bone

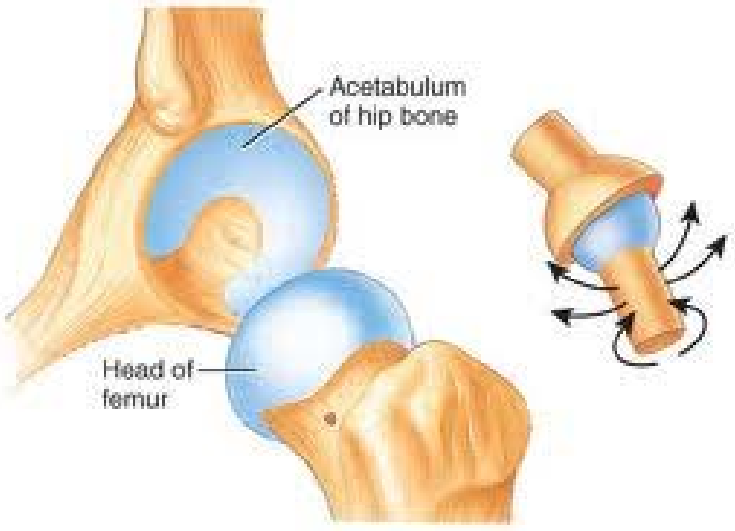
b. Turning your head is an example of a pivot movement.



Ball-and-socket joint

The rounded end of one bone fits into a cuplike cavity on another bone

Example: hips



Hinge joint

Back-and-forth movement

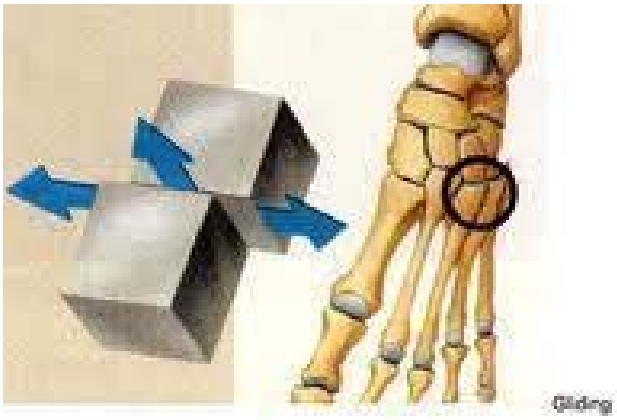
Example: elbows

Gliding joint

One part of a bone slides over another bone

Example: wrists

Used the most in the body

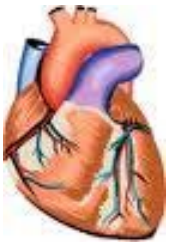


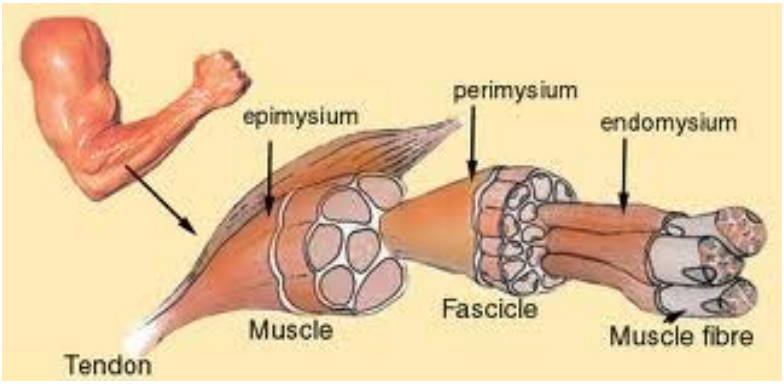
Aim: What are the parts of the Muscular System?

A muscle is an organ that can relax and contract, and provides the force to move your body parts.


Orbicularis oculi
Temporalis
Masseter
Deltoid
Sternocleidomastoid
Trapezius
Latissimus dorsi
Triceps brachii
Biceps brachii
Brachioradialis
Brachioradialis
Rectus abdominis
External oblique
Sartorius
Gracilis
Vastus lateralis
Rectus femoris
Vastus medialis
Tibialis anterior
Gastrocnemius
Soleus
Temporalis
Masseter
Trapezius
Deltoid
Triceps brachi
External oblique
Gluteus medius
Gluteus maximus
Biceps femoris
Semitendinosus
Semimembranosus
Gracilis
Gastrocnemius
Soleus
Soleus

1. Voluntary muscles— muscles that you are able to control





2. <u>Involuntary</u> muscles— muscles that you cannot control

There are three types of muscle tissue.

1. Skeletal muscles move bones and they are the most common type of muscle

- **Tendons** are thick bands of tissue that attach muscle to bones.
- Voluntary muscles
- They contract quickly and they get tired more easily so they need lots of energy!!!!
- Look striped, or striated

2. Cardiac muscle

- found only in the heart
- Cardiac muscle is striated, like skeletal muscle.
- They are involuntary!!!!

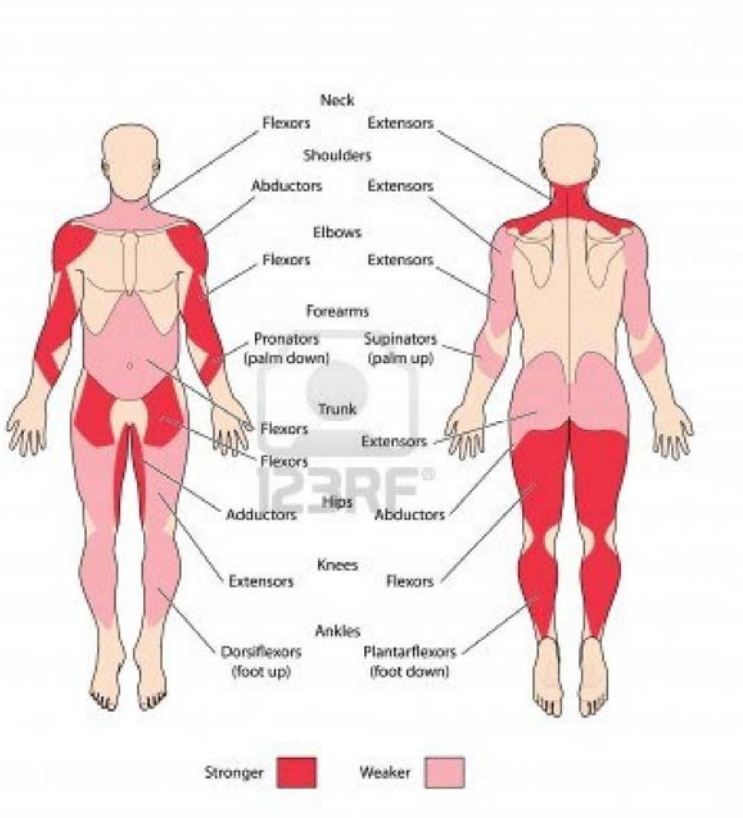
3. Smooth muscles—found in internal organs

a. Example: Intestines and stomach…bladder…lungs

b. Smooth muscles are involuntary muscles.

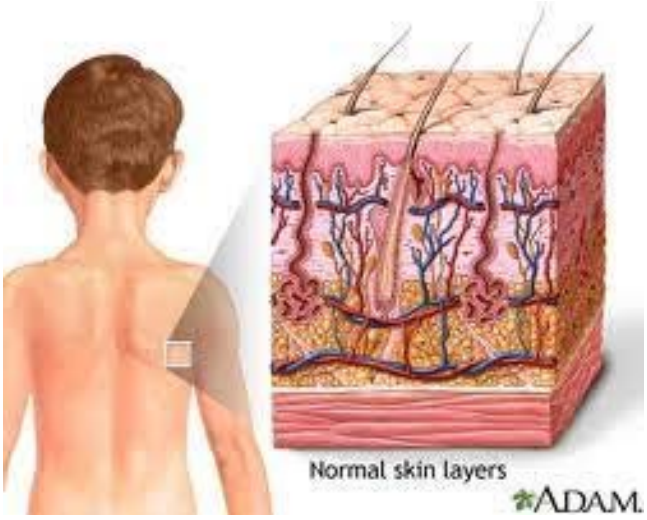
c. They contract and relax slowly….less energy needed

You move because pairs of <u>muscles</u> work together.



1. When one muscle of a pair contracts, the other relaxes.
2. Muscles always pull.
3. Over time, muscles can become larger or smaller, depending on whether or not they are used… exercise causes them to grow!!!!
4. Blood carries energy-rich molecules (food) to the muscles so they can do their work.

The Skin



A. Your skin is the largest organ of your body.

B. Skin is made up of three layers of tissue

1. Epidermis—the outer, thinnest layer

a. The outermost cells of your skin are dead and rub off when you touch anything.

b. New cells are constantly produced at the base of the epidermis.

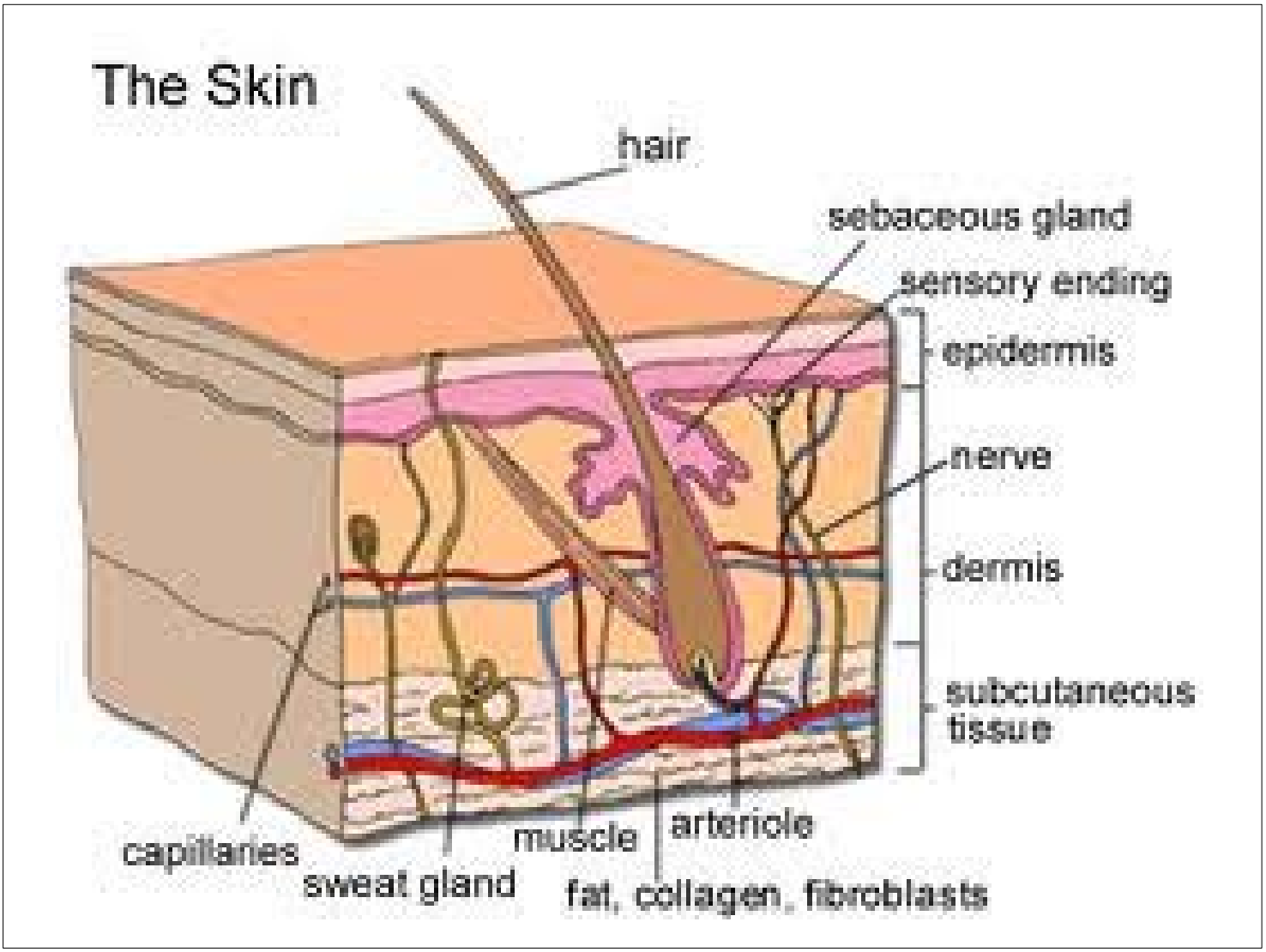
c. Cells produce **melanin,** which is a pigment that protects your skin and gives it color.

2. Dermis—the middle layer

a. The dermis is thicker than the epidermis.

b. The dermis contains blood vessels, nerves, muscles, oil, sweat glands, and
other structures.

3. Fatty layer—insulates the body


The Skin
hair
sebaceous gland
sensory ending
epidermis
nerve
dermis
subcutaneous tissue
capillaries
sweat gland
muscle
arteriole
fat, collagen, fibroblasts

C. Skin has many functions.

1. Protection—forms a protective covering over the body that prevents injury

   a. Many disease-causing organisms cannot pass through the skin.

   b. Prevents excess water loss

2. Sensory response—nerve cells in the skin detect and relay information to the brain.
3. Formation of vitamin D, which helps your body absorb calcium.
4. Regulation of body temperature

a. Blood vessels in the skin help release or hold heat.

b. Perspiration from the sweat glands eliminates excess body heat by evaporation.

5. Elimination of wastes through sweat glands

D. When injured, the skin produces new cells and repairs tears.

1. Bruises happen when tiny blood vessels beneath the skin burst and leak into surrounding tissues.
2. When you have a cut, a scab forms to prevent bacteria from entering your body.

   a. Cells in the surrounding blood vessels fight infection.

b. Skin cells beneath the scab grow to fill in the gap of the torn skin.

3. Doctors are able to repair severe skin damage.

a. Skin grafts are pieces of skin that are cut from one part of a person's own
body and moved to the injured area.

b. Doctors sometimes use skin from cadavers to prevent infections until a victim's skin heals.

c. Doctors are beginning to grow large sheets of epidermis from small pieces
of the victim's healthy skin.