Anatomy and Physiology Review Sheet
Skeletal System Test (12/7): Use your notes and text book for help. 
This packet should NOT be the only resource that you study from. This should just act as a guide.

What is on the test?
- *Information from skeletal notes packet (you will not have to label anything on this test.)*

  o **Function of the Skeletal System**
    - Support of the body
    - Protection of soft organs
      - Skull and vertebrae for brain and spinal cord
      - Rib cage for thoracic cavity organs
    - Movement due to attached skeletal muscles
    - Storage of minerals (Ca+ and P) and fats
    - Blood cell formation (hematopoiesis)

  o **Two types of bone tissue (What is it? Where is it found? What is the purpose?)**
    - Compact-Dense, looks smooth and homogenous. Found on the outside of bones.
    - Spongy-needlelike pieces of bone and open space. Found on the inner part of most bones.

  o **Classification of bones on the basis of shape (describe and give examples)**
    - **Long Bones**-longer than they are wide
      - Usually shaft w/head at ends
      - Limb bones except wrist and ankle
      - Mostly compound bone
      - Example: Humerus
    - **Short Bones**-cube shaped
      - Mostly spongy bone
      - Wrist and ankle
• Sesamoid bones are a type of short bone which form within tendons (patella)

- **Flat Bones** - Thin, flat and usually curved
  - 2 thin layers of flat compound bone sandwiching spongy bone
  - Ex. Skull, ribs and sternum

- **Irregular Bones** - miscellaneous
  - Ex. Vertebrae, hip bones

  ○ Anatomy of a Long Bone – You should be able to label the following on a diagram of a long bone (*Diaphysis, Epiphysis, Periosteum, Compact Bone, Spongy Bone, Epiphyseal Line*)
    - You should also know where the red bone marrow is found and where yellow bone marrow is found along with the functions of both. What is different about adult bone marrow compared to infant bone marrow?

  Explain the locations and functions of both types of bone marrow.
  - **Red Bone Marrow** - in adults is in spongy bone of flat bones and epiphyses of some long bones (pelvis, femur, etc.)

  - **Yellow Bone Marrow** -
    - Adults – a storage area for adipose tissue (fat)
    - Differences between adult and infant marrow
      - Infants have red bone marrow where adults have yellow marrow...in medullary cavity.
- Explain the differences between infant and fetus skeletons compared to adult skeletons. In embryos, the skeleton is primarily hyaline cartilage. In a fetus, the cartilage is covered over with bone and the cartilage is digested, forming the medullary cavity. During development, much of this cartilage is replaced by bone.

- Define the word OSSIFICATION: Bone formation/hardening.

  - Types of Bone Cells and process/purpose of bone remodeling: Explain their functions below and then give a general overview of the process of bone remodeling.

    - Osteocytes: mature bone cells found in lacunae

    - Osteoblasts: Bone-forming cells ("Bob")
- **Osteoclasts**: Bone-destroying cells ("Claude")

- **Bone Remodeling**: is a process by both osteoblasts and osteoclasts
  Bones are remodeled in response to Ca+ levels in the blood and the pull of gravity and muscles

**Bone Fractures (Common types/characteristics)**: A break in a bone. When the bone cannot withstand outside forces.

**Open (Compound) Fracture**: Broken bone penetrates through skin.

**Closed Fracture**: Broken bone does not penetrate the skin
Identify the type of fracture underneath each picture:

<table>
<thead>
<tr>
<th>Fracture type</th>
<th>Illustration</th>
<th>Description</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Comminuted</td>
<td></td>
<td>Bone breaks into many fragments.</td>
<td>Particularly common in the aged, whose bones are more brittle.</td>
</tr>
<tr>
<td>Compression</td>
<td></td>
<td>Bone is crushed.</td>
<td>Common in porous bones i.e., osteoporotic bones.</td>
</tr>
<tr>
<td>Depressed</td>
<td></td>
<td>Broken bone portion is pressed inward.</td>
<td>Typical of skull fracture.</td>
</tr>
<tr>
<td>Spiral</td>
<td></td>
<td>Broken bone ends are forced into each other.</td>
<td>Commonly occurs when one attempts to break a fall with outstretched arms.</td>
</tr>
<tr>
<td>Greenslick</td>
<td></td>
<td>Ragged break occurs when excessive twisting forces are applied to a bone.</td>
<td>Common sports fracture.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Bone breaks incompletely, much in the way a green twig breaks.</td>
<td>Common in children, whose bones are more flexible than those of adults.</td>
</tr>
</tbody>
</table>

Greenslick, Spiral, Comminuted, Compound (impacted), Compression
Treatment of a fracture: Describe the following.

- **Open Reduction (Realigniment):** Surgery to correct the fracture.

- **Closed Reduction (Realigniment):** Correcting the fracture using hands to put bones back in place.

- **Immobilization:** Place the injured area in a cast or brace.

  - Stages in the healing of a bone fracture: Be able to list and describe the four steps in the healing process of a broken bone.
    1. Hematoma forms
    2. Fibrocartilage callus forms
    3. Bony callus forms
    4. Bone remodeling.

*Describe the following divisions of the skeleton.*

  - The Axial Skeleton:
    - Forms the longitudinal part of the body
    - Divided into three parts
      - Skull
      - Vertebral column
      - Bony thorax

  - The Appendicular Skeleton:
    - Limbs (appendages)
    - Pectoral girdle
    - Pelvic girdle

  - Describe the gender differences in the pelvis between a male and female.
    - Differences:
      - **Male Pelvis:** has been optimized for bipedal locomotion.
        - Male sacrum is longer, narrower, straighter
        - Pubic arch less than 90 degrees.
      - **Female:** has evolved to its maximum width for childbirth
        - Sacrum is shorter
        - Lighter and thinner bones
        - Larger opening
        - Pubic arch greater than 90 degrees.
JOINTS: Points of contact between bones
  - FUNCTION: Hold bones securely together.
    Give the rigid skeleton mobility.

- Ways Joints are Classified:
  - Functionally – Based on MOVEMENT
  - Explain the type of joint and give examples.

  - Synarthroses – immovable (axial skeleton)=Connect the different bones of the skull
  - Amphiarthroses – slightly moveable (axial sk.)=Found between vertebrae
  - Diarthroses- freely moveable (limbs)

- STRUCTURALLY – Type of tissue
  - Explain the type of joint and give examples.

  - Fibrous joints- Bones united by fibrous tissue
    - Examples
      a. Sutures of skull
      b. Tibia and fibula connection at ankle

  - Cartilaginous joints- Bones connected by cartilage
    - Examples –
      c. Immovable joint between rib 1 and sternum
      o slightly movable (between vertebrae, between pelvis)

  - Synovial joints- Articulating bones are separated by a joint cavity
    - Articular cartilage (hyaline cartilage)
      covers the ends of bones
    - Synovial fluid is found in the joint cavity
    - Joint surfaces are enclosed by a fibrous articular capsule
    - Ligaments reinforce the joint
Structures of the synovial joint: Describe the following.

- **Bursae**: flattened fibrous sacs, common where ligaments, tendons, muscles, skin and bones rub together

- **Tendon sheath**: elongated bursae that wraps a tendon that gets a lot of friction

- **Articular (hyaline) cartilage**: (hyaline cartilage) covers the ends of bones

**HOMEOSTATIC IMBALANCES**: You should be familiar with the following.

1. **Rickets**: disease where bones fail to calcify, legs bow out
   Caused by a lack of vitamin D

2. **Herniated Discs**: Drying of the discs, along with weakening of the ligaments in the vertebral column can cause the discs to slip out of place.
3. **Scoliosis**: sideways curvature of the spine “S” shape

4. **Lordosis**: "bent backward" normal inward lordotic curvature

5. **Kyphosis**: “a hump” abnormally excessive convex curvature of the spine

6. **Dislocation**: injury or disability caused when the normal position of a joint or other part of the body is disturbed.

7. **Bursitis**: Inflammation of bursae

8. **Sprain**: Ligaments or tendons reinforcing a joint are damaged by excessive stretching. Poor blood supply = slow healing = extreme pain.

9. **Strain**: stretched or torn muscle or tendon. Twisting or pulling these tissues can cause a strain.

10. **Arthritis**: inflammatory or degenerative diseases of joints
    - Over 100 different types
    - The most widespread crippling disease in the U.S.
11. **Osteoarthritis (OA):** usually found in older people  
   Wear and tear - breakdown of cartilage  
   Slow, not usually crippling

12. **Bone Spurs:** tiny pointed outgrowth of bone.

13. **Rheumatoid arthritis (RA):** chronic, inflammatory disorder  
    Autoimmune disease.

14. **Gouty arthritis (Gout):** uric acid builds up in blood and is deposited in needle shaped crystals into joints, very destructive