1. List 5 functions of bones:
   ______________________________________________________________________
   ______________________________________________________________________

2. Classify bones according to shape: give descriptions and examples:
   long _____________________________________________________________________
   short ___________________________________________________________________
   flat _____________________________________________________________________
   irregular __________________________________________________________________
   ectopic: sutural (Wormian) ________________________________________________
   ectopic: sesamoid _______________________________________________________

3. The _____________________ is the shaft of a long bone.
   The _____________________ is the end of a long bone.
   The _____________________ is between the shaft and end. It contains cartilage that is
   responsible for _______________________ growth.

4. Red bone marrow is found in the __________________ and ________________ in infants.

5. In adults, yellow bone marrow is found in the _______________ and red bone marrow
   is found in the __________________________.

6. What type (texture) of bone is found in the diaphysis of adults? ________________
   What type (texture) of bone is found in the epiphyses of adults? ________________

7. _______________________ are immature cells that secrete osteoid bone matrix.
   _______________________ are mature cells that maintain bone matrix.
   _______________________ are monocyte-macrophages that break down bone.

8. Concentric lamellar circular arrangements in compact bone are called ______________
   or ____________________________.
   These develop around blood vessels that eventually reside in the ___________________
   which provides nutrients and removes wastes from bone tissue.
   Osteocytes are found in ____________________.
   ________________________________ allow communication between osteocytes.
   Arteries and veins feed to arterioles and venules through __________________ canals that
   are between osteons.

9. Collagen fibers are arranged in different directions. This gives bone ________________
   and ____________________.

10. Bone growth and remodeling is due to stress (load) on bone. This is ______________ law.
11. Body weight distribution goes from ______________ bone to ______________ bone.

12. Bone stores calcium. List some body functions that require calcium:
____________________________________________________________________

13. The ___________________________ is the connective tissue covering outside of bone.
____________________ fibers keep it attached to bone.
The ___________________________ lines the medullary cavity.

14. In the fetus, ___________________________ ossification forms bones from membranes.
____________________ centers are aggregations of little spicules.
____________________ bone forms first. (compact or spongy)
Name some bones formed by this process. _________________________________

15. In the fetus, ___________________________ ossification forms bones from a hyaline cartilage model.
____________________ bone forms first. (compact or spongy)

16. Which type of bone formation is also responsible for longitudinal growth during childhood?
Growth continues as long as a cartilage ______________ is in the metaphysis.
Once a cartilage ______________ is present in the metaphysis, longitudinal bone growth has stopped. ________________ growth (growth in diameter) still continues.

17. Bone _____________________ (forming and breaking down bone) occurs constantly.

18. ___________________________ is a disorder that occurs after menopause due to decreased estrogen and activity. Estrogen ____________ osteoclasts and ____________ osteoblasts.
____________________ is loss of bone matrix due to aging and decreased activity.

19. What substance found in soft drinks decreases bone matrix? _______________________

20. About _________% of bone is made up of organic compounds (mostly collagen).
About _________% of bone is made up of inorganic compounds (calcium, phosphate, carbonate, magnesium, potassium)

21. ___________________________ is the hormone that decreases blood calcium level.
It causes ________________ to build bone.
It also causes the kidneys to ________________ excess calcium.

22. ___________________________ hormone increases blood calcium level.
It causes ________________ to break down bone.
It also causes the kidneys to ________________ calcium.

23. ________________ feedback maintains bone matrix. (negative or positive)
NAME THE DISORDER

24. Over activity of the parathyroid glands produces a lack of calcification resulting in extreme flexibility and inability to stand. ____________________________

25. Low levels of calcitonin causes an overgrowth of bone in soft tissues resulting in inability to move. ____________________________

26. Disorder seen in people in their 70s. Over production of bone matrix producing bone that is spongy and not strong. ____________________________

27. Lack of vitamin D results in less calcium absorption. Bones are soft and legs bow. ___________

28. Lack of vitamin C results in less protein fibers that help maintain bone. Bleeding gums _______

29. Bone matrix doesn't form well resulting in bones that break easily. ____________________________

30. Lack of longitudinal growth due to lack of growth hormone. ____________________________

31. Over production of growth hormone during growing years. ____________________________

32. Over production of growth hormone once epiphyseal plates close and growth has stopped. Dermal bone grows in soft tissue. ____________________________

33. List and describe the steps in repair of bone after a fracture.
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________
____________________________________________________________________

34. Describe these bone terms.

See table 6-1 for additional terms, descriptions and functions (openings, joints, muscle attach.)

<table>
<thead>
<tr>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>ramus</td>
<td>foramen</td>
</tr>
<tr>
<td>trochanter</td>
<td>meatus</td>
</tr>
<tr>
<td>tuberosity</td>
<td>sinus</td>
</tr>
<tr>
<td>tubercle</td>
<td>fissure</td>
</tr>
<tr>
<td>condyle</td>
<td>squama</td>
</tr>
<tr>
<td>trochlea</td>
<td>cuneiform</td>
</tr>
<tr>
<td>sulcus</td>
<td>ptera</td>
</tr>
</tbody>
</table>
1. support; protection (organs); stores minerals (esp. calcium); stores lipids (yellow bone marrow); produces blood cells (red bone marrow)
2. long – longer than wide; humerus, femur
   short – length and width approx. the same; wrist (carpals) and ankle (tarsals) bones
   flat – 2 layers; compact bone (outer); spongy/trabecular bone (inner); skull, rib, sternum
   irregular – many different shapes; vertebrae of spinal column
   ectopic: sutural – small bones that form in sutures (immovable joints); in lambdoid suture of skull
   ectopic: sesamoid – dermal bone that grows out of connective tissue; patella, clavicle, lower jaw (mandible)
3. diaphysis; epiphysis; metaphysis; longitudinal
4. medullary cavity; epiphyses
5. medullary cavity; epiphyses
6. compact; spongy
7. osteoblasts; osteocytes; osteoclasts
8. osteons; Haversian systems; central canal; lacunae; canaliculi; perforating
9. flexibility; strength
10. Wolff's
11. compact; trabecular
12. action potentials; blood coagulation; muscle contraction; sodium and potassium balance
13. periosteum; Sharpey's; endosteum
14. intramembranous; growth; spongy; mandible, clavicles, patella
15. endochondral; compact
16. endochondral; plate; line; appositional
17. remodeling
18. osteoporosis; inhibits; stimulates; osteopenia
19. phosphoric acid
20. 33; 67
21. calcitonin; osteoblasts; excrete
22. parathyroid; osteoclasts; reabsorb
23. negative
24. Osteitis fibrosa cystica
25. myositis ossificans
26. Paget's disease
27. rickets
28. scurvy
29. osteogenesis imperfecta
30. dwarfism (one type; other types of dwarfism are due to other reasons, such as genetics)
31. gigantism
32. acromegaly
33. formation of hematoma due to bleeding
   formation of cartilage callus; phagocytes clean up injured area
   ossification - bone formation
   vascularization - restoration of blood supply and formation of more osteons
   remodeling of callus
34. Bone terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Description</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ramus</td>
<td>curve; forms angle</td>
<td>foramen</td>
<td>hole</td>
</tr>
<tr>
<td>trochanter</td>
<td>rock-like; large, rough</td>
<td>meatus</td>
<td>long passageway</td>
</tr>
<tr>
<td>tuberosity</td>
<td>smaller; smoother; rock-like</td>
<td>sinus</td>
<td>room; chamber in bone</td>
</tr>
<tr>
<td>tubercle</td>
<td>even smaller; rounded</td>
<td>fissure</td>
<td>crack; elongated</td>
</tr>
<tr>
<td>condyle</td>
<td>small, rounded, fits in fossa</td>
<td>squama</td>
<td>flat</td>
</tr>
<tr>
<td>trochlea</td>
<td>grooved; pulley-shaped</td>
<td>cuneiform</td>
<td>wedge shaped</td>
</tr>
<tr>
<td>sulcus</td>
<td>sunken; groove</td>
<td>ptera</td>
<td>wing shaped</td>
</tr>
</tbody>
</table>