Part I. Clinical Applications

1. Mrs. Bruso, a woman in her 80s is brought to the clinic with a fractured hip. X rays reveal compression fractures in her lower vertebral column and extremely low bone density in her vertebrae, hip bones, and femurs. What’s the condition, its cause, and treatment?

Mrs. Bruso has severe osteoporosis in which her bones have become increasingly fragile due to excessive bone resorption and the loss of calcium. The postmenopausal deficit of estrogen had placed her bones at risk. Excessive bone resorption and inadequate formation of new bone during remodeling can be affected by hormone levels; lack of estrogen (e.g. as a result of menopause) increases bone resorption, as well as decreasing the deposition of new bone that normally takes place in weight-bearing bones. Weight-bearing exercise, supplemental calcium, and hormone replacement therapy can be used as treatments.

2. Jerry is giving cardiopulmonary resuscitation to Ms. Jackson, an elderly woman who has just been rescued from the waters of Fort Bragg. During chest compressions what bone is he compressing?

The sternum is compressed during CPR.

3. How does the process of calcification differ from ossification?

Calcification refers to the deposition of calcium salts within a tissue.
Ossification refers specifically to the formation of bone.

4. The serving arm of many tennis players is often significantly larger (thicker) than the other arm. Explain this phenomenon.

The serving arm is subjected to much greater physical stress because the additional requirement to serve the ball. Consequently, the bones grow thicker to respond to the greater stress from the working muscle.

5. Garrett was bodysurfing when he had a bad wipeout and felt his shoulder “pop”. When Garrett finally made it back to towel he was out of breath, in pain and his arm was hanging at an odd angle. What do you think happened?

Garrett dislocated his shoulder. The head of the humerus was displaced from the glenoid cavity causing tearing of the supporting ligaments and tendons (rotator cuff) of the shoulder joint.
Part II

1. Parietal
2. Occipital
3. Clavicle
4. Scapula
5. Humerus
6. Vertebra
7. Coxal bone
8. Femur
9. Patella
10. Talus
11. Metatarsals
12. Frontal
13. Maxilla
14. Mandible
15. Sternum
16. Rib
17. Radius
18. Sacrum
19. Ulna
20. Carpals
21. Metacarpals
22. Phalanges
23. Tibia
24. Fibula
25. Tarsals
26. Phalanges

Part III

Structure of Bone: Label the structures in the diagram using the following terms. Note, terms can be used more than once:

1. Proximal epiphysis
2. Diaphysis
3. Distal epiphysis
4. Spongy bone
5. Articular cartilage
6. Epiphyseal line
7. Periosteum
8. Compact bone
9. Medullary cavity
10. Spongy bone
11. Compact bone
12. Articular cartilage
13. Endosteum
14. Yellow marrow
15. Compact bone
16. Periosteum
17. Perforating (Sharpey’s) fiber’s
18. Arteries
Part IV
Histology of Bone: Label the structures in the diagram using the following terms.

1. Medullary cavity
2. Trabeculae
3. Spongy Bone
4. Compact Bone
5. Perforating (Sharpey’s) fibers
6. Perforating (Harversian) canal
7. Blood Vessels
8. Periosteum
9. Osteon
10. Interstitial lamellae
11. Concentric lamellae
12. Central Canal
13. Canaliculi
14. Lacuna
15. Osteocyte

Part V
Histology of Bone Coloring:
1. Concentric lamellae
2. Lacunae
3. Central canal
4. Bone matrix
5. Canaliculi

Part VI
Fetal and Infant Skull:
1. Fontanels
2. Compressed
3. Growth
4. Sutures