What is Bone Structure and Function?

Worksheet

Bone is a rigid connective tissue made of a hard outer compact layer and a lighter inner spongy layer, built from collagen fibers hardened by calcium and phosphate minerals, and it functions in support, protection, movement, mineral storage, and blood cell production.

Questions

1. Which layer of bone provides its hard outer strength?

A) Spongy bone
B) Compact bone
C) Bone marrow
D) Periosteum

2. What is the main function of the periosteum?

A) Store body fat
B) Produce blood cells
C) Supply blood vessels/nerves and anchor tendons
D) Filter minerals from blood

3. Which region of a long bone contains the growth plate in children?

A) Diaphysis
B) Epiphysis
C) Metaphysis
D) Periosteum

4. About what percentage of the body's calcium is stored in bone?

A) 50%
B) 75%
C) 99%
D) 10%

5. Identify the four main regions of a long bone, like the femur.

6. Explain why bones are strong but still lightweight.

7. Describe how bone contributes to calcium homeostasis.

8. Define: What are the four main functions of bone?

9. Define: What is the diaphysis?

10. Define: What is the periosteum?

Answer Key

1. B) Compact bone - Compact bone is the dense, solid outer layer that resists bending and compression.

2. C) Supply blood vessels/nerves and anchor tendons - The periosteum is the outer membrane that nourishes bone and gives tendons a place to attach.

3. C) Metaphysis - The metaphysis lies between the shaft and the end of the bone and houses the growth plate.

4. C) 99% - Bone stores roughly 99% of the body's calcium as hydroxyapatite.

5. Epiphysis: the rounded end, covered in articular cartilage, that meets another bone at a joint Metaphysis: the growth zone between the epiphysis and shaft, containing the growth plate in children Diaphysis: the long shaft, a hollow tube of compact bone surrounding the marrow cavity Periosteum: the outer membrane that supplies blood vessels and nerves and anchors tendons

6. Compact bone forms a dense outer shell that resists bending and compression Spongy bone inside is a lattice of trabeculae that fills the interior without adding much mass The hollow marrow cavity in the shaft removes solid material where it isn't structurally needed Together this gives high strength for relatively low weight, similar to an engineered I-beam

7. Bone stores about 99% of the body's calcium as hydroxyapatite crystals When blood calcium drops, parathyroid hormone triggers osteoclasts to break down bone matrix This releases calcium and phosphate into the bloodstream When calcium is abundant, osteoblasts deposit new mineral back into the bone, restoring the store

8. Support, protection, movement (as levers for muscles), and mineral storage plus blood cell production (hematopoiesis).

9. The long shaft of a long bone, made of compact bone surrounding the medullary cavity.

10. A tough membrane covering the outer surface of bone, supplying blood vessels, nerves, and attachment points for tendons.