SI A&P - Full Discipline Demo - Fetal Pig

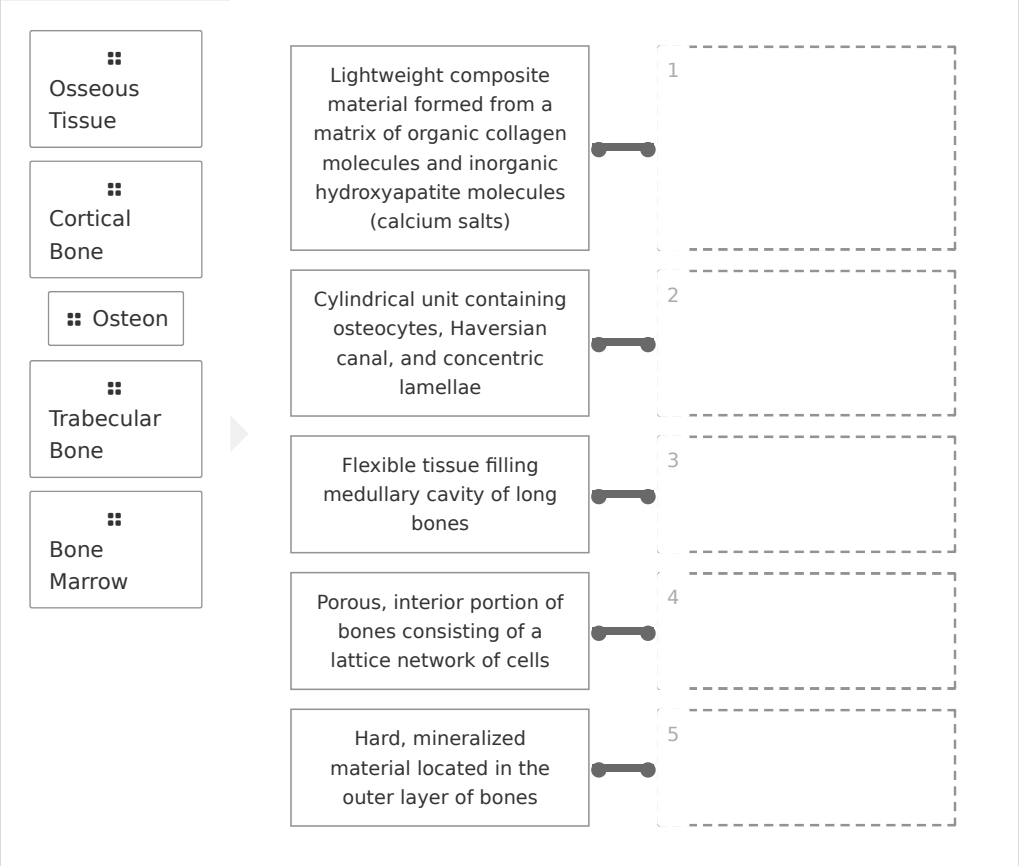
Overview of the Skeletal System

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Fetal Pig
Course	SI A&P - Full Discipline Demo - Fetal Pig
Instructor	Sales SI Demo

Test Your Knowledge

Match each term with the best description.

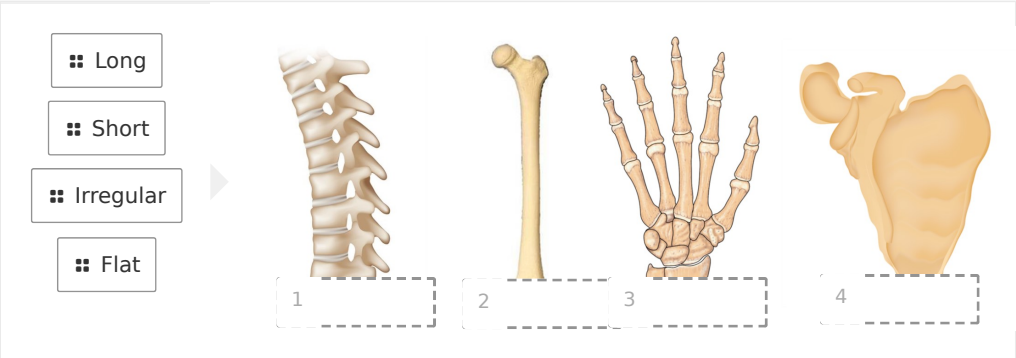


Correct answers:

1 Osseous Tissue 2 Osteon 3 Bone Marrow 4 Trabecular Bone

5 Cortical Bone

Label each bone shape with the proper term.



Correct answers:

1 Irregular 2 Long 3 Short 4 Flat

Exploration

Osteons are composed of ____.

- osteocytes
- Haversian canals
- concentric lamellae
- All of the above ✔

Blood vessels and nerves enter and exit cortical bone tissue through a passageway called the ____.

- osteon
- interstitial lamella
- nutrient foramen ✔
- osteocyte

Trabecular bone functions for energy storage and blood cell production.

- True ✔
- False

Short bones are located in the _____.

- [x] feet and hands
- [ ] upper arms
- [ ] thoracic cavity
- [ ] upper legs

Exercise 1

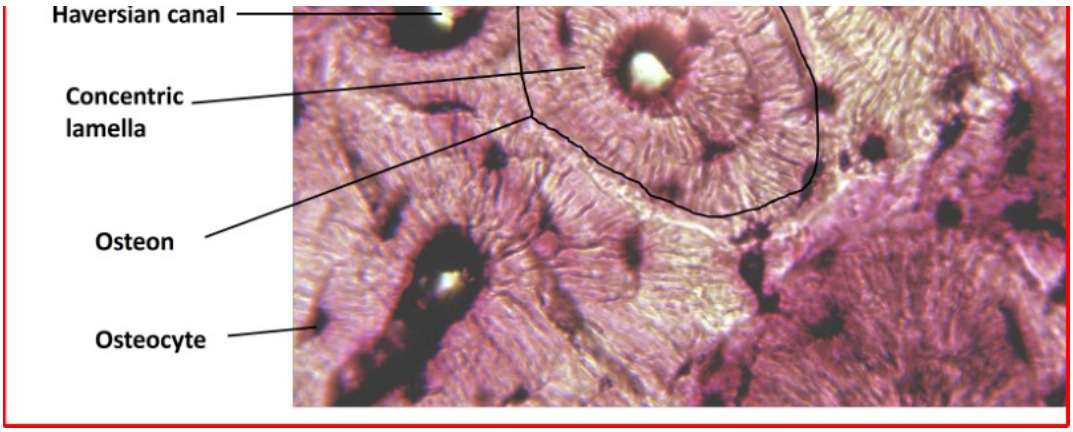
How do the structures examined in cortical bone tissue contribute to its function? Reference Photo 1 in your explanation.

Cortical bone tissue is formed of hard, mineralized material located in the outer layer of bones where it functions to provide strength in tension and compression. Cortical tissue consists of cylindrical osteons containing Haversian canals, osteocytes, and concentric lamellae as labeled in Photo 1.

How do the structures examined in trabecular bone contribute to its function? Reference Photo 2 in your explanation.

Trabecular bone forms the porous, interior area of bones, and functions for energy storage and blood cell production. Trabecular bone consists of a lattice-like network of cells, called trabeculae, which enclose a flexible tissue called bone marrow as labeled in Photo 2. Red marrow occurs primarily at the ends of long bones and is made from myeloid tissue, a source of hematopoietic stem cells, which functions to form new blood cells.

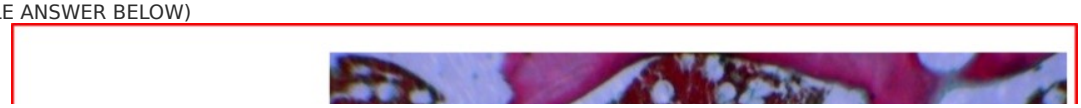
Photo 1: Ground Compact Bone
(SAMPLE ANSWER BELOW)

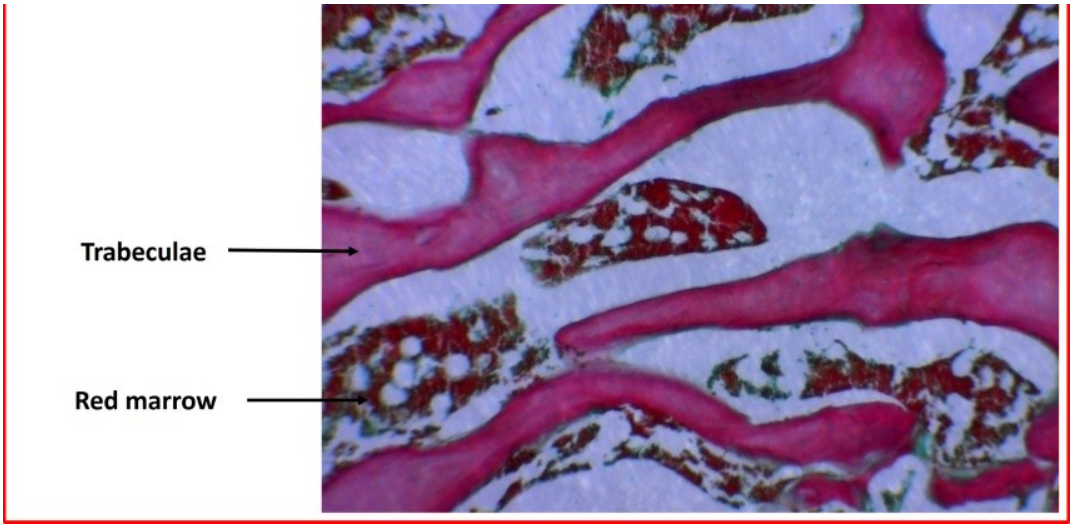


Data Table 1: Microscopic Examination of Bone
(SAMPLE ANSWER BELOW)

Structure	Magnification	Comments
Ground Compact Bone	150X	Students will only comment if structures were not identified
Spongy Bone	60X	Students will only comment if structures were not identified

Photo 2: Spongy Bone
(SAMPLE ANSWER BELOW)





Exercise 2

How does the structure of vertebrae aid in their function?

The irregular shape of the vertebrae provide protection for the spinal cord in the form of a central canal, foramen for the passage of spinal nerves, and articulations with other vertebrae to provide both support and flexibility for the body.

How are the humerus and femur similar in form and function?

The humerus and femur are similar in form as they are both long bones. Both bones are similar in function as they are involved in providing support and movement of the appendages: arms (humerus) and legs (femur).

Photo 3: Skull Lateral View
(SAMPLE ANSWER BELOW)

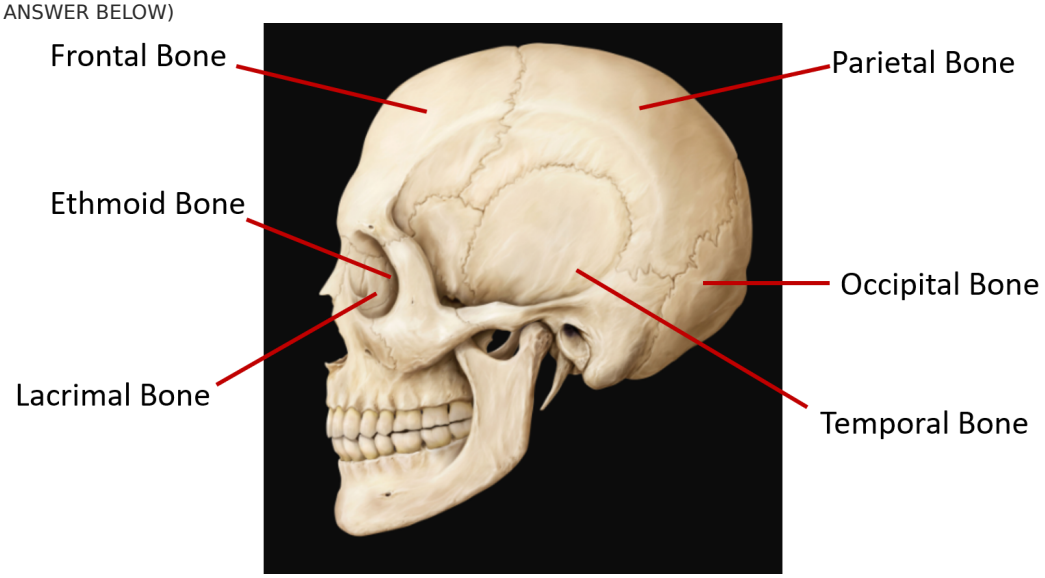


Photo 4: Skull Anterior View
(SAMPLE ANSWER BELOW)

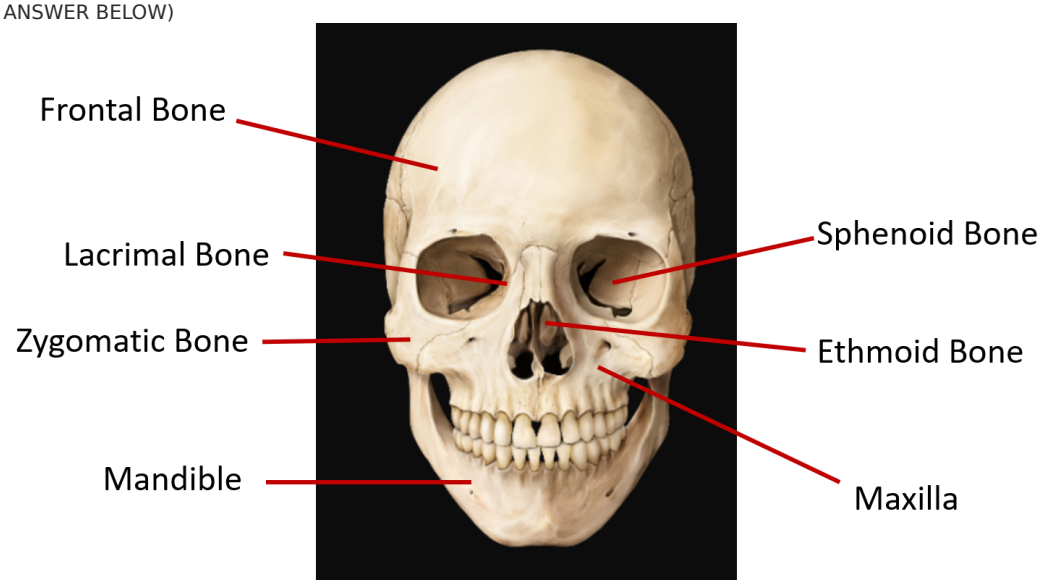


Photo 5: General Anatomy Posterior View
(SAMPLE ANSWER BELOW)

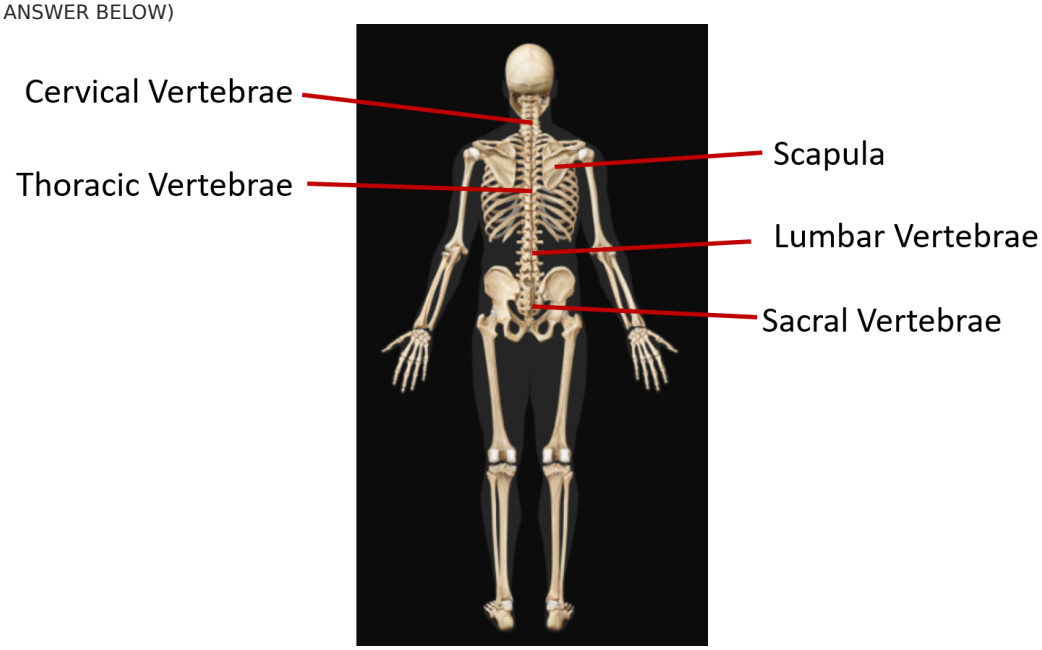
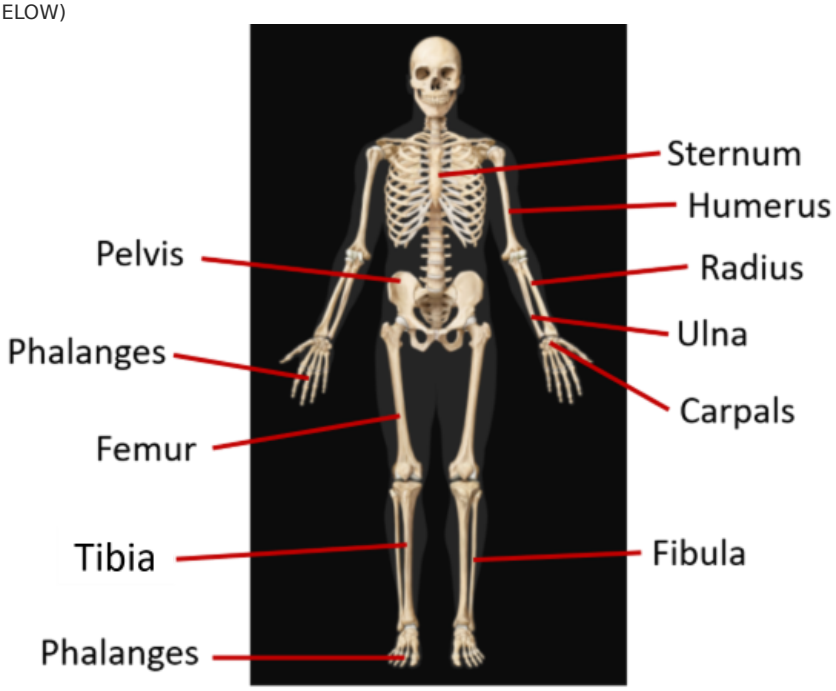


Photo 6: General Anatomy Anterior View
(SAMPLE ANSWER BELOW)



Data Table 1: Bone Shapes, Functions, and Articulations

(SAMPLE ANSWER BELOW)

Structure	Shape(s)	Skeletal Function	Articulations and/or Associations
Bones of the skull: Frontal, occipital, parietal, and temporal	Flat	Provides protection for the brain.	Forms sutures with other bones of the skull; Occipital bone articulates with C1 vertebrae.
Bones of the orbit: Frontal, sphenoid, zygomatic, maxilla, palatine, lacrimal, and ethmoid	Flat and Irregular	Provides protection for the structures of the eye. Provides facial structure as well.	Forms sutures with other bones of the orbit and face.
Vertebrae: Cervical, thoracic, lumbar, and sacral	Irregular	Provides protection for the spinal cord; provides mobility for bending and turning the trunk.	Articulates with other vertebrae more proximal and distal; C1 articulates with the occipital bone; T1-T12 articulate with ribs; sacrum articulates with the ilia and the coccyx.
Maxilla	Flat	Provides facial bony structure and site for teeth (alveolar processes) for mastication.	Forms sutures with other bones of the face.
Mandible	Irregular	Provides bony structure of jaw and site for teeth (alveolar processes) for mastication.	Articulates with the mandibular fossa of the temporal bone.
Sternum	Flat	Provides protection for the thoracic cavity.	Articulates with the ribs and the clavicle.
Ribs	Flat	Provides protection for the thoracic cavity.	Articulates with the sternum and the vertebrae (T1-T12).
Scapula	Flat, Irregular	Provides protection of posterior thoracic ribs; provides mobility and stability for movements of the shoulder.	Articulates with the clavicle and the humerus.
Humerus	Long	Provides support for movement of the arm.	Articulates with the scapula proximally and the ulna and radius distally.

Radius	Long	Provides support for movement of the forearm.	Articulate with humerus and the ulna proximally, distally with proximal carpals and the ulna.
Ulna	Long	Provides support for movement of the forearm.	Articulate with humerus and the radius proximally, distally with proximal carpals and the radius.
Carpals	Short	Creates bony architecture of the proximal region of the hand.	Articulate with each other, the radius and ulna, and the metacarpals.
Phalanges (hands and feet)	Long	Provides support for fine motor movements of hand and foot. Phalanges of feet also provide for foot stability.	Articulate with other phalanges; proximal phalanges articulate with metacarpals and metatarsals.
Pelvis	Irregular	Provides support for standing upright.	Articulate with the sacrum (Ilia), the femur, and form sutures between the ischium, ilium, and pubic bones on the R and L sides.
Femur	Long	Provides support for standing upright and weight bearing activities.	Articulates with the pelvis proximally; articulates with the patella and tibia distally.
Tibia	Long	Provides support for standing upright and weight bearing activities.	Articulates with the femur proximally, the fibula proximally and distally, and the talus distally.
Fibula	Long	Provides stability for the ankle joint.	Articulates with the tibia both proximally and distally.
Tarsals	Short	Creates bony architecture of the proximal region of the foot.	Articulate with each other, the tibia, and the metatarsals.

Competency Review

Cells penetrate and thrive within the rigid matrix that form osseous tissue.

- True ✔
- False

Cortical bone tissue consists of cylindrical units called _____.

- osteocytes
- trabeculae
- osteons ✔
- interstitial lamellae

Cortical bone tissue forms the interior area of long bones.

- True
- False ✔

The medullary cavity of long bones is filled with _____.

- bone marrow ✔
- osteocytes
- hydroxyapatite molecules
- concentric lamellae

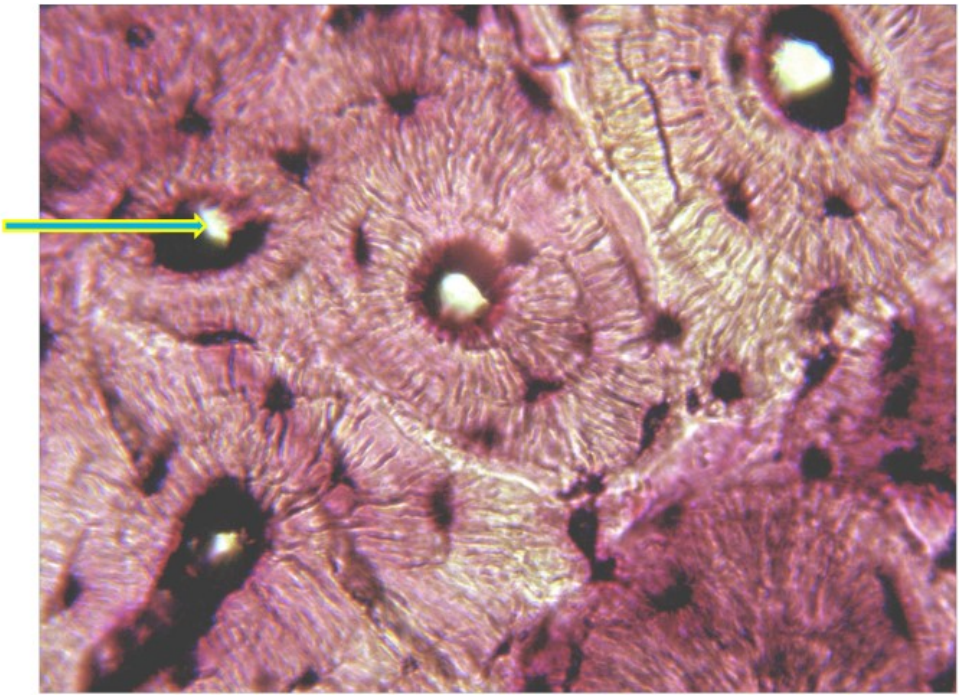
_____ bones are characterized by a length approximately equal to the width of the bone.

- Irregular
- Long
- Short ✔
- Flat

Bones may fit into more than one shape category.

- True ✔
- False

The arrow in the micrograph of ground compact bone below indicates a(n) ____.



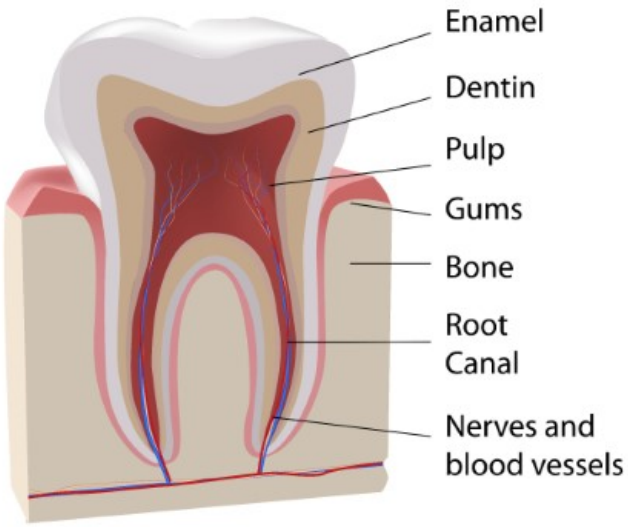
- trabecula
- osteocyte
- Haversian canal ✔
- medullary cavity

The long bone of the upper arm indicated by the arrow in the image of the virtual model is the ____.

- humerus ✔
- femur
- scapula
- sternum

Extension Questions

Teeth are calcified structures found in the oral cavity embedded to the upper jaw (maxilla) and lower jaw (mandible). Teeth consist of non-vascularized, mineralized dentin tissue coated in enamel. At the center of each tooth is a pulp cavity filled with blood vessels, nerves, and connective tissue. Appy your knowledge of osseous tissue to explain why teeth are not considered bones.



(SAMPLE ANSWER BELOW)

Unlike teeth, osseous tissue is composed of two layers of vascularized tissue: cortical bone (outer layer) and trabecular bone (inner layer). The primary tissue of teeth is non-vascularized dentin which is coated by enamel. The pulp cavity of teeth, which contains nerves, blood vessels, and connective tissues is significantly different than the marrow cavities of long bones. Lastly, bones function to assist movement, protect organs, provide structure, produce blood cells, and store energy. None of these functions are performed by teeth.