NAME _____ LAB TIME/DATE _____

REVIEW SHEET
exercise
9

Overview of the Skeleton: Classification and Structure of Bones and Cartilages

Bone Markings

1. Match the terms in column B with the appropriate description in column A:

	Column A	Column B
l; spine	1. sharp, slender process*	a. condyle
n; tubercle	2. small rounded projection*	b. crest
b; crest	3. narrow ridge of bone*	c. epicondyle
o; tuberosity	4. large rounded projection*	d. fissure
g; head	5. structure supported on neck†	e. foramen
j; ramus	6. armlike projection†	f. fossa
a; condyle	7. rounded, convex projection†	g. head
d; fissure	8. narrow depression or opening‡	h. meatus
h; meatus	9. canal-like structure‡	i. process
e; foramen	10. opening through a bone‡	j. ramus
f; fossa	11. shallow depression†	k. sinus
k; sinus	12. air-filled cavity	l. spine
m; trochanter	13. large, irregularly shaped projection*	m. trochanter
c; epicondyle	14. raised area of a condyle*	n. tubercle
i; process	15. projection or prominence	o. tuberosity

* A site of muscle attachment.
† Takes part in joint formation.
‡ A passageway for nerves or blood vessels.

Classification of Bones

2. The four major anatomical classifications of bones are long, short, flat, and irregular. Which category has the least amount of spongy bone relative to its total volume? *Long*

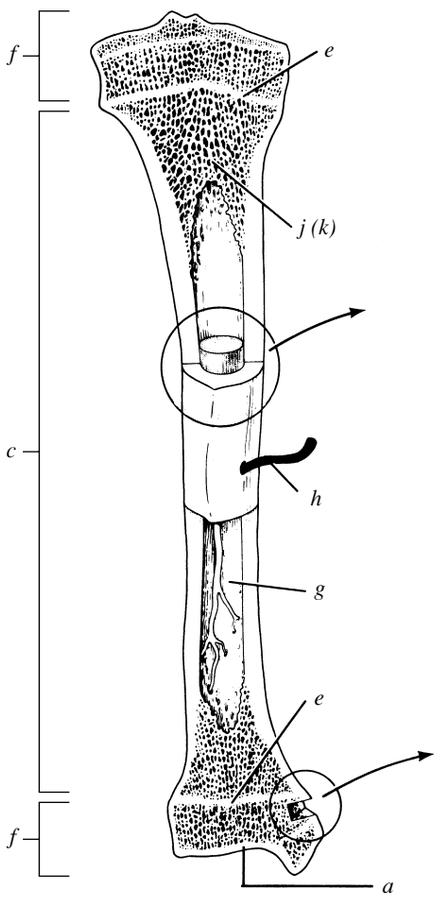
3. Classify each of the bones in the next chart into one of the four major categories by checking the appropriate column. Use appropriate references as necessary.

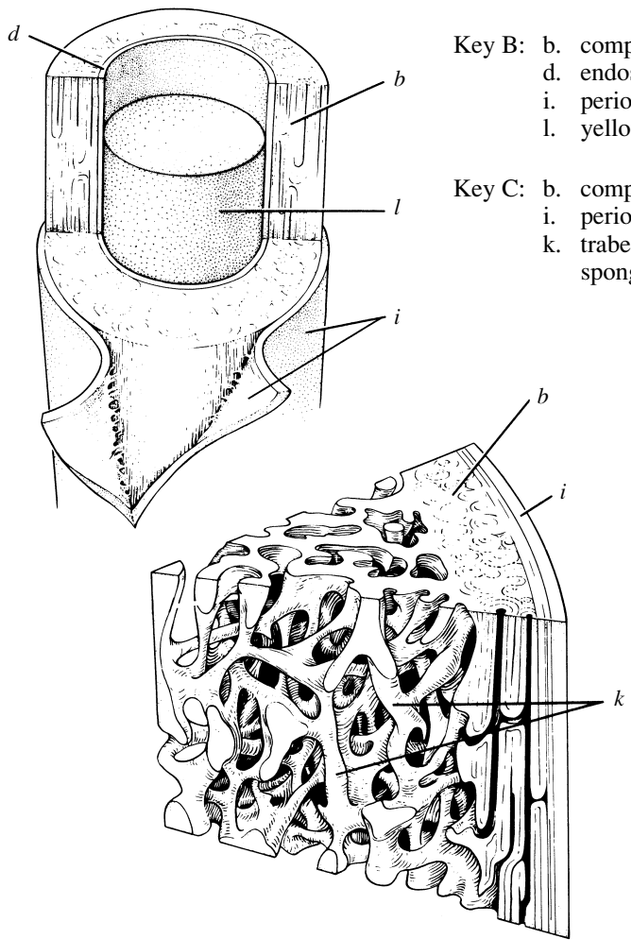
	Long	Short	Flat	Irregular
humerus	✓			
phalanx	✓			
parietal			✓	
calcaneus		✓		
rib			✓	
vertebra				✓
ulna	✓			

Gross Anatomy of the Typical Long Bone

4. Use the terms below to identify the structures marked by leader lines and braces in the diagrams (some terms are used more than once).

Key A:
a. articular cartilage
b. compact bone
c. diaphysis
d. endosteum
e. epiphyseal line
f. epiphysis
g. medullary cavity
h. nutrient artery
i. periosteum
j. red marrow cavity
k. trabeculae of spongy bone
l. yellow marrow





Key B:
b. compact bone
d. endosteum
i. periosteum
l. yellow marrow

Key C:
b. compact bone
i. periosteum
k. trabeculae of spongy bone

5. Match the terms in question 1 with the information below.

f 1. contains spongy bone in adults

c 2. made of compact bone

j 3. site of blood cell formation

d, *i* 4. major submembranous site of osteoclasts

c 5. scientific term for bone shaft

g (l) 6. contains fat in adult bones

e 7. growth plate remnant

i 8. major submembranous site of osteoblasts

6. What differences between compact and spongy bone can be seen with the naked eye? *Compact bone appears homogeneous; spongy bone has obvious spaces.*

7. What is the function of the periosteum? *Protects the bone and is the structure from which blood vessels and nerves enter bone.*

Microscopic Structure of Compact Bone

8. Trace the route taken by nutrients through a bone, starting with the periosteum and ending with an osteocyte in a lacuna.

Periosteum → *perforating canal* → *central (Haversian) canal* → *canaliculus* → osteocyte

9. Several descriptions of bone structure are given below. Identify the structure involved by choosing the appropriate term from the key and placing its letter in the blank. Then, on the photomicrograph of bone on the right (208×), identify all structures named in the key and bracket an osteon.

Key: a. canaliculi b. central canal c. concentric lamellae d. lacunae e. matrix

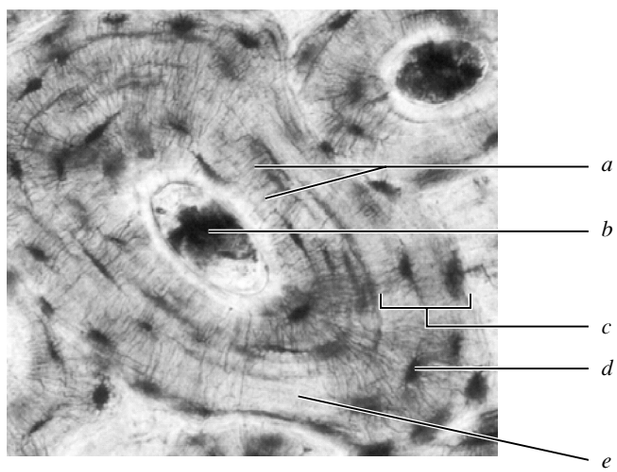
c 1. layers of bony matrix around a central canal

d 2. site of osteocytes

b 3. longitudinal canal carrying blood vessels, lymphatics, and nerves

a 4. minute canals connecting osteocytes of an osteon

e 5. inorganic salts deposited in organic ground substance



Ossification: Bone Formation and Growth in Length

10. How does the appearance of the chondrocytes in the transformation zone differ from those in the growth zone?

Those in the transformation zone are much larger (hypertrophied).

11. Compare and contrast events occurring on the epiphyseal and diaphyseal faces of the epiphyseal plate.

Epiphyseal face: *Cartilage matrix is being laid down.*

Diaphyseal face: *Cartilage matrix is being eroded and replaced by bone matrix.*

Chemical Composition of Bone

12. What is the function of the organic matrix in bone? *To provide flexibility (and strength).*

13. Name the important organic bone components. *Collagenic and elastic fibers and ground substances; cells.*

14. Calcium salts form the bulk of the inorganic material in bone. What is the function of the calcium salts?

To provide hardness and strength.

15. Baking removes *water* from bone. Soaking bone in acid removes *calcium salts*.

16. Which is responsible for bone structure? (circle the appropriate response)

inorganic portion organic portion (both contribute)

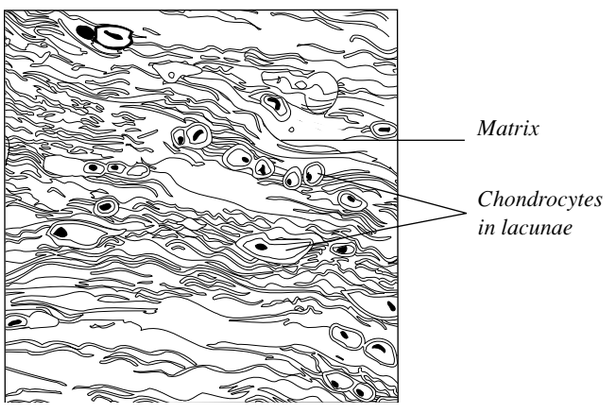
Cartilages of the Skeleton

17. Using key choices, identify each type of cartilage described (in terms of its body location or function) below.

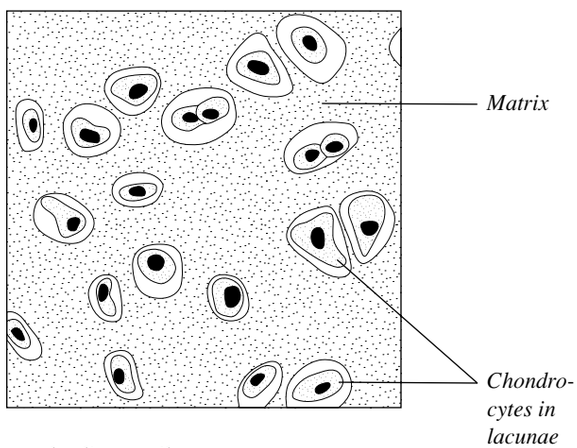
Key: a. elastic b. fibrocartilage c. hyaline

a; elastic	1. supports the external ear	*b; fibrocartilage*	6. meniscus in a knee joint
b; fibrocartilage	2. between the vertebrae	*c; hyaline*	7. connects the ribs to the sternum
c; hyaline	3. forms the walls of the voice box (larynx)	*b; fibrocartilage*	8. most effective at resisting compression
a; elastic	4. the epiglottis	*a; elastic*	9. most springy and flexible
c; hyaline	5. articular cartilages	*c; hyaline*	10. most abundant

18. Identify the two types of cartilage diagrammed below. On each, label the *chondrocytes in lacunae* and the *matrix*.



(a) *fibrocartilage*



(b) *hyaline cartilage*