

Interactions CD: Support & Movement

Bone Formation: Intramembranous & Endochondral Ossification

Directions:

Insert and install your Interactions: Foundations CD.

- a. Click the "Contents" button,
- b. Open the Skeletal System file,
- c. Click on Animations,
- d. Work through Bone Formation.

Complete the following worksheet and add it to your notes.

Interactions: Support & Movement CD/Contents/Skeletal System/Animations/Bone Formation

1. Define *ossification*.

2. Where does intramembranous ossification occur?

Intramembranous Ossification

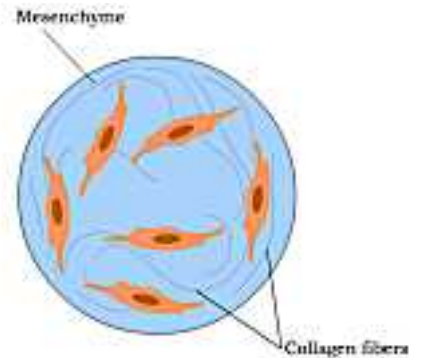
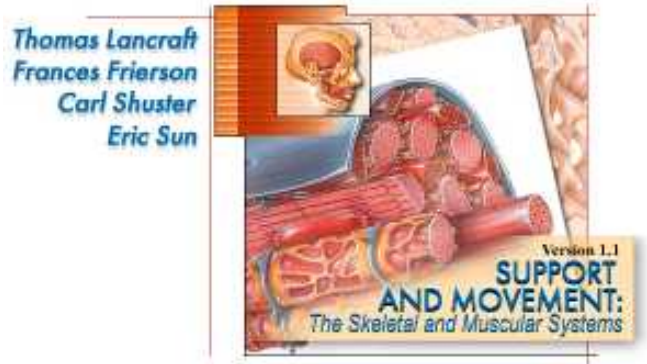
3. Explain how ossification centers form during *intramembranous ossification*. Include each of the following:

A. *Mesenchymal cells* -

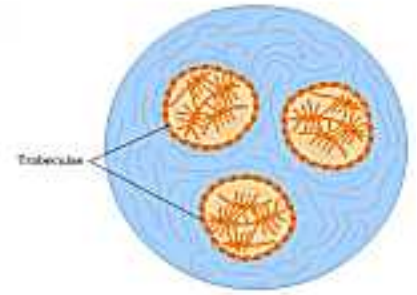
B. *Osteogenic cells* -

C. *Osteoblasts* -

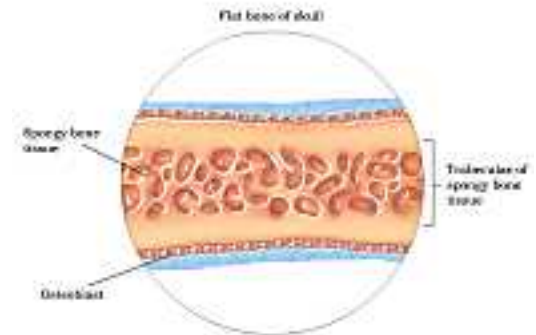
D. *Osteoid (bone matrix)*



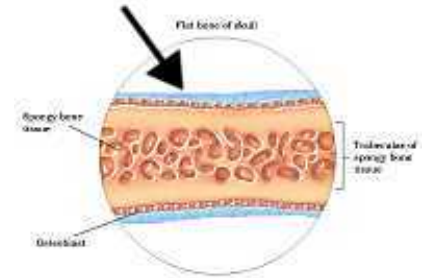
4. How do trabeculae form which leads to *spongy bone* formation?



5. How does *red bone marrow* develop?



6. Where does the *periosteum* form?



7. Where does *compact bone* frequently replace *spongy bone* and where does spongy bone remain?

8. Define *sutures* and *fontanels*. What is the function of each?



Endochondral Ossification

9. Endochondral ossification is the replacement of _____ with bone.
10. Describe the formation of the *cartilage model*. Include each of the following:
- a. *Mesenchymal cells* -

b. *Chondroblasts* -

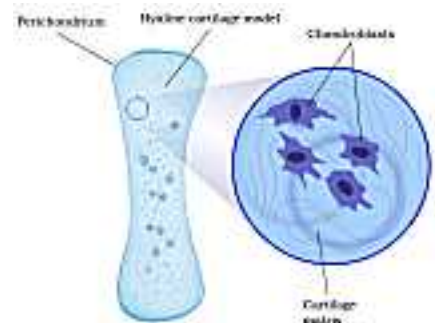
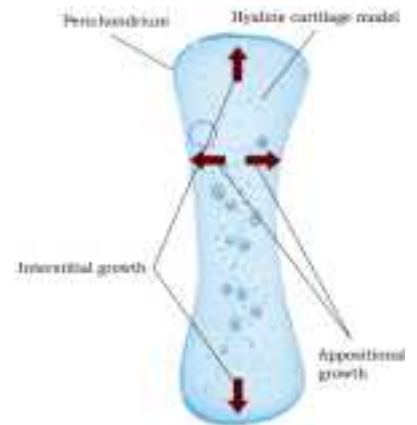
11. Contrast *interstitial* and *appositional growth* of the cartilage model.

12. Describe events during *cartilage model formation*. Include each of the following:

a. *nutrient artery penetration* - _____

b. *Osteogenic cells* and *osteoblasts* - _____

c. Contrast the *perichondrium* and the *periosteum*. - _____



13. Describe (step 2) *growth of the cartilage model*. Include each of the following:

14. Describe (step 3) *bone collar and periosteum formation*.

15. Describe (step 4) *primary ossification center formation*.

a. Nutrient deprivation - _____

b. Osteocyte carrying capillaries - _____

c. What occurs at the *primary ossification center* - _____

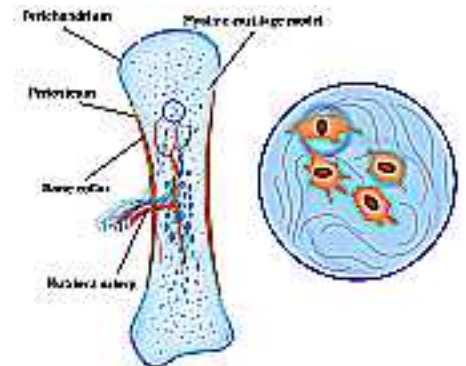
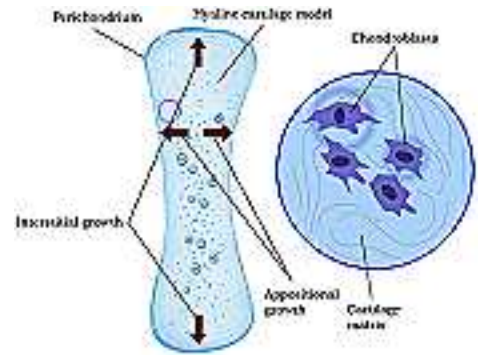
d. *Osteoblasts* building spongy bone trabeculae - _____

16. Describe events of (step 5) *remodeling*. Include each of the following:

a. *medullary cavity* formation - _____

b. Capillaries and red bone marrow - _____

c. *Diaphysis* formation - _____

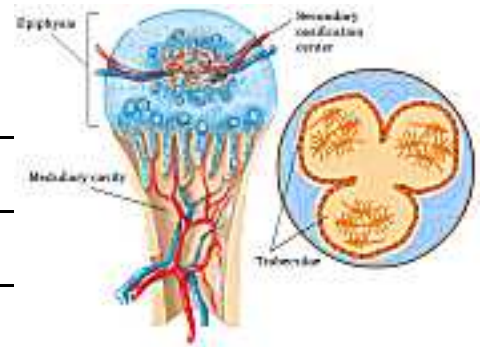


17. Describe *secondary ossification center formation*. Include each of the following:

a. When does this happen? _____

b. Blood vessels entering the cartilaginous epiphysis _____

d. Why does the interior of the epiphysis remain spongy? _____



18. Describe articular cartilage and epiphyseal plate formation. Include the following:

a. *Hyaline (articular) cartilage* (location and function) - _____

b. *Epiphyseal plate* location and function - _____

