Intramembranous & Endochondral Ossification

To complete this worksheet, select:

Module: Support and Movement
Activity: Animations
Title: Intramembranous & Endochondral Ossification

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 deprival - _______________________________________
      _______________________________________________________________________
   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 ________________
      ____________________________________________________________________
   c. How does secondary ossification differ from primary ossification?
      ____________________________________________________________________
      ____________________________________________________________________
   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 - ________________________
      ____________________________________________________________________