**SKELETAL SYSTEM & ARTICULATIONS**

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| **Topic from**  **HAPS Guidelines** | **Learning Outcome** | **Tortora** | **HTHS 1110 Objectives** |
| General functions of bone & the skeletal system | 1. Describe the general functions of the skeletal system. | 6.1 | Module 8 Objective 1. Describe the six major functions of the skeletal system. |
| Structural components – microscopic anatomy | 1. List and describe the cellular and extracellular components of bone tissue. | 6.3 | Module 8 Objective 2. Describe the tissues that comprise the skeletal system. Compare the two major tissues of the skeletal system, bone and cartilage, as to amount and kind of matrix, and as to relative blood supply. |
| 1. Identify the internal structural components of compact bone and spongy bone. | 6.3 | Module 8 Objective 6. Compare the structural features of compact vs. spongy bone. |
| 1. Identify the types of cartilage tissues that are found in the skeletal system and explain the functions of each. | 4.4 | Module 8 Objective 8. Identify the functions of articular cartilage and study its role at the epiphyseal growth plate. Know the age of epiphyseal plate closure. |
| 1. Explain the roles of dense regular and dense irregular connective tissue in the skeletal system. | 4.4 | Module 7 Objective 9. Be able to define, and give examples of, the following connective tissue types: loose connective tissue; dense connective tissue; cartilage; bone; liquid. |
| Structural components – gross anatomy | 1. Identify the structural components of a long bone, with emphasis on region of longitudinal growth. | 6.2 | Module 8 Objective 8. Identify the functions of articular cartilage and study its role at the epiphyseal growth plate. Know the age of epiphyseal plate closure. |
| 1. Explain the functions of those structural components in the context of a whole bone. | 6.2 |
| Physiology of embryonic bone formation (ossification, osteogenesis) | 1. Explain the roles osteogenic cells play in the formation of bone tissue. | 6.3 | Module 8 Objective 5. Identify the respective roles of osteoblasts, osteocytes, and osteoclasts in bone growth. |
| 1. Compare and contrast intramembranous and endochondral (intracartilagenous) bone formation. | 6.5 | Module 8 Objective 7. Describe the important features of the two types of ossification and indicate which parts of the skeleton are formed by these types. |
| Physiology of bone growth, repair, & remodeling | 1. Compare and contrast the function of osteoblasts and osteoclasts during bone growth, repair, and remodeling. | 6.5 | Module 8 Objective 5. Identify the respective roles of osteoblasts, osteocytes, and osteoclasts in bone growth. |
| 1. Explain the hormonal regulation of skeleton growth. | 6.5 | Module 8 Objective 9. Identify the role in bone homeostasis played by hormones and vitamin D. |
| 1. Explain the roles of calcitonin, parathyroid hormone and calcitriol in bone remodeling and blood calcium regulation. | 6.5  6.6 |
| 1. Contrast the remodeling processes of a child (birth to adolescence) and an adult (middle to old age). | 6.8 |  |
| Organization of the skeletal system | 1. Define the two major divisions of the skeletal system (axial and appendicular) and list the general bone structures contained within each. | 7.1 | Module 8 Objective 14. Identify the major groups of bones which belong to the axial skeleton and to the appendicular skeleton. |

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| Gross anatomy of bones | 1. Identify the types of bones based on shape and composition (compact vs. spongy), and relate the shapes of bones to their functions. | 7.2 | Module 8 Objective 3. Identify the classes of bones and the characteristics of each class.  Module 8 Objective 4. Define the structural and functional features of a typical long bone. |
| 1. Identify the individual bones and their location within the body. | 7.4  7.5  7.6  7.7  8.1  8.2  8.3  8.4  8.5 | Module 8 Objective 15. Given a diagram of the skull, locate all 8 cranial bones and all 14 facial bones. Know whether or not they are paired.  Module 8 Objective 17. Identify the general number and location of each of the five groups of vertebrae. Compare and contrast the normal side-to-side and front-to-back spinal curvatures, and understand why they are important to normal body function.  Module 8 Objective 20. Identify the bones of the ribcage (axial skeleton) and specify their location.  Module 8 Objective 21. Identify the bones of the upper extremity of the appendicular skeleton and specify their location.  Module 8 Objective 22. Identify the bones of the lower extremity of the appendicular skeleton and specify their location. |
| 1. Identify bone markings (spines, processes, foramina, etc.) and describe their function (e.g., point of articulation, muscle tendon attachment, ligament attachment, passageway for nerves and vessels). | 7.4  7.5  7.6  7.7  8.1  8.2  8.3  8.4  8.5 | Module 8 Objective 11. Define the following channels and depressions on the surface of bone: foramen, meatus, fossa.  Module 8 Objective 12. Define the following bone surface protrusions: condyle, epicondyle, spinous process, tubercle, tuberosity, trochanter.  Module 8 Objective 13. Define the terms suture and fontanel. |
| 1. Compare and contrast the skull of a fetus/infant with the skull of an adult. | 7.4 |  |
| 1. Compare and contrast the adult male and female skeletons. | 8.4 | Module 8 Objective 23. Compare and contrast the adult male and female skeleton. Be able to describe the differences in the male and female pelvis. |
| Classification, structure, & function of joints (articulations) | 1. With respect to classification of joints: |  | Module 8 Objective 24. Classify joints both functionally and structurally. Describe how the functional and anatomical classifications are related. |
| Describe the functional classification, based on degree of movement allowed - synarthrotic, amphiarthrotic, and diarthrotic – and provide examples of each type. | 9.19.29.39.49.8 |
| Describe the anatomical classification, based on structure - fibrous, cartilaginous, and synovial – and provide examples of each type. | 9.19.29.39.49.8 |
| Explain how the functional and anatomical classifications are related. | 9.19.7 |
| 1. Identify the structural components of the synovial joint, including accessory structures like bursae, tendon sheaths, and ligaments. | 9.49.6 | Module 8 Objective 25. Identify the accessory components of the synovial joint, including bursae, tendon sheaths, ligaments, and the joint capsule |
| 1. Describe and demonstrate the generalized movements of synovial joints. | 9.5  9.6 | Module 8 Objective 28. Given a diagram of a joint in flexion, extension, abduction, adduction, rotation or circumduction, identify the name of the movement. Define dorsiflexion, plantar flexion, inversion, eversion, pronation, and supination. |
| 1. For each of the six structural types of synovial joints: |  | Module 8 Objective 26. For each of the six structural types of synovial joints:   1. describe the anatomical features of that structural type 2. identify the location in the body where each structural type can be found 3. predict the kinds of movements that each structural type will allow. |
| Describe the anatomical features of that structural type. | 9.59.6 |
| Identify locations in the body where each structural type can be found. | 9.59.6 |
| Predict the kinds of movements that each structural type will allow. | 9.59.6 |
| 1. Describe how the aging process affects joints and the joint components and how it affects movement ability. | 9.9 | Module 8 Objective 27. Describe how the aging process affects joints and how it affects the ability to move. |
| Application of homeostatic mechanisms | 1. Provide specific examples to demonstrate how the skeletal system and articulations respond to maintain homeostasis in the body. |  |  |
| 1. Explain how the skeletal system and articulations relate to other body systems to maintain homeostasis. |  |  |
| Predictions related to homeostatic imbalance, including disease states & disorders | 1. Predict factors or situations affecting the skeletal system and articulations that could disrupt homeostasis. |  | Module 8 Objective 10. List the main types of fractures most commonly found in the body. Describe the major steps involved in the repair of bone fractures. |
| 1. Predict the types of problems that would occur in the body if the skeletal system and articulations could not maintain homeostasis. |  | Module 8 Objective 29. Describe the abnormalities of spinal curvature: Scoliosis, kyphosis, and lordosis. |