

Subject: Biology from four
ch: 3 skeletal, muscular and integumentary system

1. Differences Between

a) Axial and Appendicular Skeleton

- **Axial skeleton** forms the central axis of the body
- **Appendicular skeleton** forms the limbs and appendages.
- **Axial Skeleton** is required for good posture, balance, and stability of the body
- **Appendicular skeleton** mainly helps in the movement of the body.
- There is a total of 80 bones in the **axial skeleton**
- **Appendicular skeleton** consists of 126 bones.
- **Axial bones** are fused
- **Appendicular bones** are strong and never fused.
- **Axial bones** are Skull, Rib Cage, Vertebral Column and sternum
- **Appendicular bones** are pectoral and pelvic girdle along with forearms, hands, feet and ankle.

b) Bones and cartilage

Bones	Cartilage
Bones are the hard, inelastic and a tough organ that forms part of the vertebral skeleton.	Cartilage is a soft, elastic and flexible connective tissue that protects the bone from rubbing against each other.
Bones are of two types: compact or spongy.	Cartilage is of three types: Hyaline cartilage, fibro cartilage and elastic cartilage.
Bone cells are known as osteocytes.	Cartilage cells are known as chondrocytes.
Presence of blood vessels.	Absence of blood vessels (nutrients are obtained through diffusion)

c) Exoskeleton and endoskeleton

- Exoskeleton are external to the soft tissue
- Endoskeleton are internal

2. Describe the shapes of bones and bone formation

- **Long bones** are found in the arms (humerus, ulna, radius) and legs (femur, tibia, fibula), as well as in the fingers (metacarpals, phalanges) and toes (metatarsals, phalanges). Long bones function as levers; they move when contract muscles.
- **flat bone** include the cranial (skull) bones, the scapulae (shoulder blades), the sternum (breastbone), and the rib
- **Short bones** in the human skeleton are in the carpals of the **wrists** and the tarsals of the ankles. Short bones provide stability and support as well as some limited motion.
- **irregular bone** is one that does not have any easily characterized shape -vertebrae and some skull bones
- **sesamoid bone -patella knee cape**

3. Indentify the types of joints with respect to form and function

- Joints is the connection between two or more bones
- Types of joints and with their function
 - **Immovable joints** allow little or no movement at the joint. Most immovable joints are fibrous joints. Besides the bones of the cranium, immovable joints include joints between the tibia and fibula in the lower leg and between the radius and ulna in the lower arm.
 - **Partly movable joints** permit slight movement. Most partly movable joints are cartilaginous joints. Besides the joints between vertebrae, they include the joints between the ribs and sternum (breast bone).
 - **Movable joints** allow bones to move freely. All movable joints are synovial joints. Besides the knee, they include the shoulder, hip, and elbow. Movable joints are the most common type of joints in the body.

4. Outline function of skeletal system

- supports the body
- facilitates movement
- protects internal organs
- produces blood cells
- stores and releases minerals and fat

5. Describe arthritis. What are the two common forms of arthritis? And which types of arthritis is not related to age?
 - Describe arthritis is an inflammation of the joints.
 - two common forms of arthritis **osteoarthritis** and **rheumatoid arthritis**
 - Which types of arthritis is not related to age it most often develops in **people** in their 40 or older. It's also more common in women and **people** with a family history of the condition. But it **can** occur at **any age** as a result of an injury or be associated with other joint-related conditions, such as gout or rheumatoid **arthritis**.
6. For healthy bones, sun exposure is advised, justify that
 - That's because **your** body produces vitamin D when exposed to the **sun**. The so-called "**sunshine** vitamin" helps the body absorb calcium, which is essential for **bone** health.
7. What is osteoporosis?
 - a medical condition in which the bones become brittle and fragile from loss of tissue, typically as a result of hormonal changes, or deficiency of calcium or vitamin D.
8. What is significance of synovial fluids?
 - Significance of synovial fluid helps protect the ends of bones from damage by friction or secretes lubricating substance
9. What are the major kinds of joints in the human body?
 - Fixed joints
 - Semi-movable joints
 - Movable joints
10. What is ossification?
 - Is the process of bone formation
11. Compare between the types of muscles with respect to form and function
 - **Skeletal muscles** attach to and move bones by contracting and relaxing in response to voluntary messages from the nervous system
 - **Smooth muscle** is found in the walls of hollow organs throughout the body(the digestive tract)
 - **Cardiac muscle**, found only in the myocardium, contracts in response to signals from the cardiac conduction system to make the heart beat
12. Describe microscopic structure of striated muscle fibers

- **Striated muscle** tissue is a **muscle** tissue that features repeating functional units called sarcomeres. The presence of sarcomeres manifests as a series of bands visible along the **muscle fibers**, which is responsible for the **striated** appearance observed in microscopic images of this tissue.
- 13. Explain the mechanism of muscular contraction or sliding filament theory
 - **Sliding filament theory** explains the mechanism of [muscle contraction](#) based on muscle proteins that slide past each other to generate movement. According to the sliding filament theory, the myosin (thick) filaments of [muscle fibers](#) slide past the actin (thin) filaments during muscle contraction, while the two groups of filaments remain at relatively constant length.
- 14. Differentiate between fast-twitch and slow-twitch muscle
 - **Slow-twitch muscle fibers** support long distance endurance activities like marathon running, while
 - **Fast-twitch muscle fibers** support quick, powerful movements such as sprinting or weightlifting.
- 15. Contrast the function of flexors and extensor?
 - **Flexor muscle**, any of the **muscles** that decrease the angle between bones on two sides of a joint, as in bending the elbow or knee. Several of the **muscles** of the hands and feet are named for this function
 - **Extensor muscle**, any of the **muscles** that increase the angle between members of a limb, as by straightening the elbow or knee or bending the wrist or spine backward. The **movement** is usually directed backward, with the notable exception of the knee joint.
- 16. What cause muscles to become fatigued? Why do you think the heart muscle never suffers from fatigue?

Causes of muscle fatigue

Exercise and other physical activity are a common cause of muscle fatigue. Other possible causes of this symptom include:

- age
- anemia

- anxiety
- dehydration
- depression
- HIV
- hypothyroidism
- lack of exercise
- medications
- mineral deficiency
- pregnancy
- tuberculosis

Why do you think the heart muscle never suffers from fatigue?

- **Cardiac muscle** resists **fatigue** so well because it's got more mitochondria than skeletal **muscle**. With **so** many power plants at its disposal, the **heart** doesn't need to stop and chill out. It also has a steady supply of blood bringing it oxygen and nutrients

17. Explain briefly the structure and function of skin

Structure of skin: Three distinct layers can be seen in the skin

- Epidermis - consists of keratinizing stratified squamous epithelium
- Dermis - consists of fibroelastic connective tissue
- Hypodermis - consists mostly of white adipose tissue (sometimes referred to as the subcutis)

Function of skin is

- Protection
- Regulation of body temperature
- Formation of vitamin D
- Sensation
- Excretion

18. Describe the derivative of skin

- derivatives (**sweat glands, sebaceous glands, mammary glands, hair, nails**)

19. identify two types of glands found in the skin and describe their function

- types of glands found in the skin are sweat gland and sebaceous gland (oil glands)
- **Sweat glands** have **three** primary **functions**:
Thermoregulation: **sweat** (through evaporation and evaporative heat

loss) can lead to cooling of the surface of the **skin** and a reduction of body temperature.

- Sebaceous gland (oil glands) the normal function of sebaceous glands is to produce and secrete sebum, a group of complex oils. Sebum lubricates the **skin** to protect against friction and makes it more impervious to moisture.

20. Describe the structure of nails and hairs

- **Hair** is a filament that grows from a **hair follicle** in the dermis of the skin.
- **Structure of hair is:** nail plate ,cuticle and lunula
- The **nail** root is the portion of the **nail** found under the surface of the skin at the near, or proximal, end of the **nail**.
- **Structure nail** consists of the nail plate, the nail matrix and the nail bed below it, and the grooves surrounding it

21. Recognize the diseases and disorders of integumentary system

- **Acne** involves the clogging of pores, which can lead to **infection** and **inflammation**, and is often seen in adolescents. Other disorders, not discussed here, include seborrheic dermatitis (on the scalp), **psoriasis**, cold sores, impetigo, scabies, hives, and warts.

22. Identify the substance that prevents the hair and skin from drying out and the gland where this substance is produced.

- The **skin** not only **keeps** most harmful **substances out**, but also **prevents** the loss **of** fluids. A major ... Sebaceous **glands** are oil **producing glands** which help inhibit bacteria, keep us waterproof and **prevent** our **hair** and **skin** from **drying out**.