6. SKELETAL AND MUSCULAR SYSTEM

TEACHING TASK (Page 67)

Multiple Choice Questions

1) Which body parts work together to help us perform daily activities like eating or running? Answer: b) Bones and muscles *Explanation*: Bones provide structure and support, while muscles enable movement through contraction and relaxation, working together for activities like eating (jaw movement) and running (leg movement).

2) What covers and protects the bones and muscles in our body? Answer: c) Skin *Explanation*: Skin acts as the outer protective layer, shielding bones, muscles, and other internal structures from injury and infection.

3) What allows bones to grow and repair themselves? Answer: c) Blood cells inside the bones *Explanation*: Bone marrow within bones produces blood cells, including those involved in bone growth and repair (e.g., osteoblasts for bone formation).

4) What happens to the cartilage in our body as we grow older? Answer: d) It is replaced by hard bones *Explanation*: In early development, much of the skeleton is cartilage, which gradually ossifies into hard bone as we age, especially during childhood and adolescence.

5) Why is the skeleton system important to study? Answer: b) To understand how our bones move and protect our organs *Explanation*: The skeletal system provides structure, enables movement via joints, and protects vital organs (e.g., skull protects the brain, rib cage protects the heart and lungs).

LEARNER'S TASK (Page 68)

1) What are bones primarily made of? Answer: c) Calcium, proteins, vitamins, and minerals *Explanation*: Bones are primarily composed of calcium phosphate for hardness, collagen (a protein) for flexibility, and other vitamins/minerals for maintenance and growth.

2) How many bones are we born with? Answer: b) 300 *Explanation*: Newborns have approximately 300 bones, some of which fuse during growth, resulting in 206 bones in adults.

3) What helps bones to grow and repair themselves? Answer: c) Blood cells *Explanation*: Blood cells, particularly those produced in bone marrow (e.g., osteoblasts), are critical for bone growth and repair.

4) What do bones help to protect? Answer: c) Internal organs like heart, lungs, and brain *Explanation*: Bones like the skull, rib cage, and vertebrae protect vital organs such as the brain, heart, lungs, and spinal cord.

5) What happens to the number of bones as we grow? Answer: a) It decreases *Explanation*: The number of bones decreases from about 300 at birth to 206 in adulthood due to the fusion of certain bones (e.g., in the skull and spine).

TEACHING TASK (Page 69 – 71)

1) Which part of the skull contains 8 bones? Answer: C) Upper part *Explanation*: The cranium (upper part of the skull) consists of 8 bones that encase the brain.

2) What is the purpose of the skull? Answer: B) To protect the brain *Explanation*: The skull's primary function is to protect the brain from injury.

3) What allows the lower jaw to be movable? Answer: B) Flexible muscles *Explanation*: The lower jaw (mandible) moves via muscles like the masseter and temporalis, which are attached to the temporomandibular joint.

4) What is the purpose of the cushion of cartilage found in each vertebra? Answer: C) To protect the spinal cord *Explanation*: Intervertebral discs (cartilage) act as cushions, absorbing shock and protecting the spinal cord while allowing flexibility.

5) What passes through the hole in each vertebra? Answer: B) Spinal cord *Explanation*: The vertebral foramen in each vertebra forms a canal through which the spinal cord passes.

6) What are the two pairs of lower ribs called that are not attached to the chest bone? Answer: C) Floating ribs *Explanation*: The lowest two pairs of ribs (11th and 12th) are called floating ribs because they do not attach to the sternum.

7) What part of the body do the bones of the shoulder attach to? Answer: C) Pectoral girdle *Explanation*: The shoulder bones (clavicle and scapula) form the pectoral girdle, connecting the arms to the axial skeleton.

8) Which bone is the longest in the human body? Answer: C) Femur *Explanation*: The femur (thigh bone) is the longest and strongest bone in the human body.

9) What are the bones of the lower leg called? Answer: A) Tibia and Fibula *Explanation*: The lower leg consists of the tibia (larger, weight-bearing bone) and fibula (thinner, stabilizing bone).

Advanced Level

10) Which bones form a cage around the heart and lungs? Answer: B) Ribs *Explanation*: The rib cage, formed by the ribs, sternum, and thoracic vertebrae, protects the heart and lungs.

11) Fill in the blank: The upper arm bone, known as the _____, extends from the shoulder to the elbow. Answer: Humerus
Explanation: The humerus is the single bone of the upper arm, connecting the shoulder to the elbow.

12) Fill in the blank: The longest bone in the human body, located in the upper half of the legs, is called the _____. Answer: Femur
Explanation: The femur, located in the thigh, is the longest bone in the body.

Matching Type:

13) Match the bones to their respective descriptions Answer:

Skull → C. Protects the brain and contains holes for nose, eyes, ears, and mouth.

Spine → A. Forms a long flexible column of bones extending from the neck to the end of the back; protects the spinal cord.

Rib Cage → B. Encloses and forms a cage around the heart and lungs; consists of thin, flat, bow-shaped bones joined to the backbone and sternum.

14) How many vertebrae are typically found in the human vertebral column, and what causes the reduction in the number of bones as we grow? Answer:

An adult human typically has **26 vertebrae** in the vertebral column (7 cervical, 12 thoracic, 5 lumbar, 1 sacrum, 1 coccyx). The reduction in the number of bones occurs because some bones, such as those in the skull (e.g., fontanelles) and sacrum/coccyx, fuse together during growth,

reducing the total count from approximately 300 at birth to 206 in adulthood.

15) What is the significance of the cushion of cartilage found in each vertebra, and how does the vertebral column contribute to the protection of the spinal cord?

Answer: The cushion of cartilage (intervertebral discs) absorbs shock, provides flexibility, and prevents vertebrae from rubbing against each other, thus protecting the spinal cord from damage. The vertebral column surrounds the spinal cord, with each vertebra's foramen forming a protective bony canal that shields the spinal cord from injury while allowing flexibility and movement.

LEARNER'S TASK (Page 71 - 72)

1) How many bones make up the face? Answer: B) 14 *Explanation*: The human face consists of 14 facial bones, including the mandible, maxilla, and others.

2) Which of the following is not a hole found in the skull? Answer: D) Brain *Explanation*: The skull has openings for the nose, eyes, and mouth, but the brain is not a hole; it is protected by the skull.

3) What gives shape to the nose? Answer: B) Cartilage *Explanation*: Nasal cartilage provides the flexible structure and shape of the nose.

4) What is another name for the backbone? Answer: B) Vertebral Column *Explanation*: The backbone is also called the vertebral column or spine.

5) How many vertebrae are typically found in the backbone of an adult human? Answer: C) 26 *Explanation*: An adult vertebral column typically has 26 vertebrae (7 cervical, 12 thoracic, 5 lumbar, 1 sacrum, 1 coccyx).

6) How many pairs of ribs do humans typically have? Answer: B) 12
Explanation: Humans typically have 12 pairs of ribs, forming the rib cage.

7) How many pairs of limbs are there in the human body? Answer: C) Two *Explanation*: Humans have two pairs of limbs: two arms (forelimbs) and two legs (hindlimbs).

8) What is the upper arm bone called? Answer: C) Humerus
Explanation: The humerus is the bone of the upper arm, extending from the shoulder to the elbow.

Advanced Level

9) Which of the following statements is correct? Answer: B) The vertebral column protects the spinal cord

Explanation:

A is incorrect: The backbone has 26 vertebrae in adults, not 33 (33 is the count before fusion of the sacrum and coccyx).

B is correct: The vertebral column encases and protects the spinal cord.

C is incorrect: The lowest two pairs of ribs (floating ribs) are not attached to the sternum.

D is incorrect: All vertebrae have a foramen for the spinal cord.

Fill in the blank:

10) The lower arm consists of two long bones known as the _____ and _____. Answer: Radius and Ulna *Explanation*: The lower arm (forearm) consists of the radius and ulna bones.

11) Fill in the blank: The wrist and hand together comprise a total of _____ bones. Answer: 27 *Explanation*: Each hand and wrist has 27 bones (8 carpals, 5 metacarpals, 14 phalanges).

Matching Type Answer:

12) Upper part of the skull → B. 8 bones

Face → A. 14 bones

Cartilage in the nose → D. Long piece of cartilage

Vertebra → C. Each bone of the backbone

13) What are the three main divisions of the forelimb, and what is the function of the upper arm bone called the humerus?

Answer:

The three main divisions of the forelimb are:

Upper arm (humerus)

Forearm (radius and ulna)

Hand (carpals, metacarpals, phalanges)

The humerus connects the shoulder to the elbow, allowing movements like flexion, extension, and rotation of the arm.

14) Describe the composition of the hind limbs, including the names of the bones in the upper and lower sections, and highlight the significance of the femur in the skeletal structure.

Answer:

Composition of hind limbs:

Upper section: The femur (thigh bone) is the single bone of the upper leg.

Lower section: The lower leg consists of the tibia and fibula. The foot includes tarsals, metatarsals, and phalanges.

Significance of the femur: The femur is the longest and strongest bone in the body, supporting body weight during movement, enabling walking and running, and connecting the hip to the knee for stability and mobility.

TEACHING TASK (Page 74 – 76)

1) What is the function of cartilage in joints? Answer: c) To cushion the ends of bones *Explanation*: Cartilage covers the ends of bones in joints, reducing friction and acting as a shock absorber.

2) Which type of joint allows little or no movement? Answer: a) Immovable joints *Explanation*: Immovable joints (synarthroses), like those in the skull, allow little to no movement, providing stability.

3) Which type of joint allows movement only in one direction? Answer: b) Hinge Joint *Explanation*: Hinge joints, like those in the elbow and knee, allow movement in one direction (flexion and extension).

4) What is the function of the pivot joint? Answer: d) Allows rotation or turning movement *Explanation*: Pivot joints, like the one between the atlas and axis vertebrae, allow rotational movement (e.g., turning the head).

5) Which type of muscles are responsible for controlling movements like reading, writing, walking, or running? Answer: a) Voluntary muscles *Explanation*: Voluntary muscles (skeletal muscles) are under conscious control and enable activities like walking and writing.

6) What is the function of cardiac muscles? Answer: b) Pumping blood throughout the body *Explanation*: Cardiac muscles, found in the heart, contract involuntarily to pump blood throughout the body.

Advanced Level

7) Which joints allow movement in multiple directions? (Select all that apply) Answer: b) Ball and Socket Joint, d) Gliding Joint *Explanation*: Ball and socket joints (e.g., hip, shoulder) allow movement in all directions. Gliding joints (e.g., wrist, ankle) allow sliding movements

in various directions. Hinge joints (a) move in one direction, and pivot joints (c) allow rotation.

8) Which statements accurately describe characteristics of voluntary muscles? (Select all that apply) Answer: a) They control the movement of the body, b) They are under our control, c) They work in pairs *Explanation*: Voluntary muscles (skeletal muscles) control body movement, are under conscious control, and work in pairs (e.g., biceps and triceps). They are not found in internal organs (d), which is characteristic of involuntary muscles.

9) Fill in the blank: Movable joints are found in the _____, legs, hip, and shoulders. Answer: Arms *Explanation*: Movable joints (e.g., hinge, ball-and-socket) are found in the arms, legs, hips, and shoulders.

10) Fill in the blank: The presence of _____ allows us to move movable joints freely. Answer: Cartilage (or Synovial fluid) *Explanation*: Cartilage and synovial fluid in movable joints reduce friction and enable smooth movement.

Matching Type Answer:

11) Hinge Joint → C. Allows movement only in one direction

Ball and Socket Joint → A. Allows movement in all directions; one bone is like a ball and fits into the hollow socket of the other bone

Pivot Joint → B. Allows side to side, upward and downward movement; found between the head and neck, including the joint between the first two vertebrae and the skull (atlas)

Gliding Joint → D. Allows bones to slide on each other in various directions along the plane of the joint; found in the wrist and ankle

12) Which type of muscles are responsible for controlling voluntary movements like reading, writing, walking, or running? Answer: Voluntary muscles (skeletal muscles) *Explanation*: These muscles are

under conscious control and enable precise movements for activities like writing and running.

13) Where are cardiac muscles primarily found, and what is their main function?

Answer:

Location: Cardiac muscles are primarily found in the heart.

Function: Their main function is to pump blood throughout the body through involuntary contractions.

LEARNER'S TASK (Page 76)

1) Where are immovable joints commonly found in the body?
Answer: c) Between bones of the skull *Explanation*: Immovable joints (sutures) are found in the skull, providing stability and protection for the brain.

2) What is the function of ligaments in joints? Answer: c) To hold the joint together *Explanation*: Ligaments are tough, fibrous tissues that connect bones and stabilize joints, preventing dislocation.

3) Where is the ball and socket joint primarily found? Answer: c) Hip and shoulders *Explanation*: Ball and socket joints, allowing multi-directional movement, are found in the hips and shoulders.

4) Which joint allows bones to slide past each other in various directions? Answer: d) Gliding Joint *Explanation*: Gliding joints, found in the wrist and ankle, allow bones to slide past each other in multiple directions.

Advanced Level

5) Where can gliding joints be found in the human body? (Select all that apply) Answer: c) Wrist, d) Ankle *Explanation*: Gliding joints are located in the wrist (carpals) and ankle (tarsals), allowing sliding movements.

6) What are examples of involuntary muscles? (Select all that apply) Answer: b) Smooth muscles, c) Cardiac muscles *Explanation*: Involuntary muscles include smooth muscles (found in organs like the stomach) and cardiac muscles (in the heart), which work without conscious control. Voluntary muscles (a) and skeletal muscles (d) are under conscious control.

Fill in the blank

7) _____ help to hold the joint together and prevent it from being dislocated. Answer: Ligaments *Explanation*: Ligaments are connective tissues that stabilize joints by holding bones together.

8) Fill in the blank: An example of an immovable joint is the joints between the bones of the _____. Answer: Skull *Explanation*: The sutures between the bones of the skull are immovable joints, providing rigidity.

Matching Type Answer:

9) Voluntary Muscles → C. Control the movement of the body and are under our control.

Smooth Muscles → A. Not in our control, work on their own, found in internal organs.

Cardiac Muscles → B. Found in the heart, involuntary, responsible for pumping blood throughout the body.

10) Which type of joint allows movement in all directions and is primarily found in the hip and shoulders?

Answer: Ball and Socket Joint *Explanation*: Ball and socket joints, located in the hips and shoulders, allow movement in all directions (e.g., rotation, flexion, extension).

11) Where is the pivot joint typically found in the human body, and what type of movement does it facilitate?

Answer:

Location: Pivot joints are typically found between the atlas and axis vertebrae (in the neck).

Movement: They facilitate rotational or turning movement, such as turning the head side to side.