Progress Check

Fill in the blanks

(i) Our skeleton consists of bones _____ and _____

(ii) _____ is the chief component of our skeleton

(iii) Shape wise the bones can be classified as _____, _____, _____ and _____

(iv) The central hollow part of the long bones is known as _____

(v) A bone becomes soft and flexible when placed in dilute _____

Solution:

(i) Cartilages, ligaments

(ii) Bone

(iii) Long, short, flat, irregular

(iv) Bone marrow

(v) Weak hydrochloric acid

Progress Check

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Mention if the following statements are true (T) or false (F)

(i)	**Humerus of the upper arm is the longest bone.**	**T/F**
(ii)	**Axial skeleton incudes shoulder and hip girdles**	**T/F**
(iii)	**There are 10 vertebrae in the neck**	**T/F**
(iv)	**There are three kinds of ribs – true, false and floating**	**T/F**
(v)	**The shoulder girdle is large and trough-shaped**	**T/F**

Solution:

(i) The statement is false. Femur or the thigh bone is the longest bone

(ii) The statement is false. Appendicular skeleton consists of shoulder and hip girdles

(iii) The statement is false. The neck has 7 vertebrae

(iv) The statement is true.

(v) The statement is false. The hip pelvic girdle is a large trough-shaped part.

Progress Check

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1. Mention if the following statements are true (T) or false (F).

(i)	**The flexor and extensor muscles of the arm are antagonistic muscles**	**T/F**
(ii)	**Muscles can contract as well as elongate**	**T/F**
(iii)	**Muscles are attached to bones by ligaments**	**T/F**
(iv)	**Cardiac muscle is a voluntary muscle**	**T/F**
(v)	**Bending of arm on elbow is an example of first order of lever mechanism.**	**T/F**

Solution:

(i) The statement is true.
(ii) The statement is false. Muscles can contract and relax but cannot lengthen.
(iii) The statement is true.
(iv) The statement is false. Cardiac muscles are involuntary muscles.
(v) The statement is true.

2. Match the bones (Column I) with the kind of joint (Column II)

	Column I (Bones)	**Column II (Joint)**
(i)	**Humerus and shoulder girdle**	**(a) Partially movable**
(ii)	**Two adjacent vertebrae**	**(b) Gliding**
(iii)	**Skull and upper end of the backbone**	**(c) Immovable**
(iv)	**Bones of brain box**	**(d) Ball and socket**
(v)	**Rib and breast bone**	**(e) Pivot**

Solution:

	Column I (Bones)	Column II (Joint)
(i)	Humerus and shoulder girdle	Ball and socket
(ii)	Two adjacent vertebrae	Gliding
(iii)	Skull and upper end of the backbone	Pivot
(iv)	Bones of brain box	Immovable
(v)	Rib and breast bone	Partially movable

Review Questions

Page: 125&126

A. Multiple Choice Type

1. Your external ear(pinna) is supported by

(a) Bone
(b) Cartilage
(c) Tendon
(d) Capsule

Solution:

(b) Cartilage

Our skeleton consists of bones, cartilages and ligaments. Cartilages are the supporting and the connecting structures.

2. The type of joint found at shoulder is also found at

(a) Elbow
(b) Knee
(c) Ankle
(d) Hip

Solution:

(d) Hip

The joint present at the shoulder and the hip is known as the ball and socket joint.

3. Which one of the following categories of vertebrae are correctly numbered

(a) Cervical - 7
(b) Thoracic - 10
(c) Lumbar - 4
(d) Sacral - 4

Solution:

(a) Cervical - 7

The cervical or neck vertebrae are 7 in number

4. Human skeleton altogether contains 213 bones. Which of these are the 6 bones?

(a) Neck vertebrae
(b) Ear ossicles
(c) Carpals
(d) Metacarpals

Solution:

(b) Ear ossicles

Ear ossicles from a pair of ears i.e., 3 x 2 = 6. 6 bones

B. Very short answer type

1. **Name the parts of the skeleton where the following are located: Transverse process, glenoid cavity, shoulder-blade, acetabulum.**

Solution:

The table below shows the different parts of the skeleton and their location:

Part of the skeleton	Location
Transverse process	Neural arches in the vertebra
Glenoid cavity	Pectoral girdle
Shoulder-blade	Shoulder girdle
Acetabulum	Pelvic girdle

2. **Name any two parts of your body where the supporting skeleton is made of cartilage instead of bone.**

Solution:

Cartilage is a connective tissue that is usually found in close association with the bone. The two parts of the body where the supporting skeleton is made of cartilage instead of bone are:

- Tip of the nose
- Walls of trachea
- External ear

C. Short Answer Type

1. **What is the difference between a true rib and a floating rib?**

Solution:

Listed below are the differences:

True rib	Floating rib
True ribs are the first seven pairs of ribs	Floating ribs are the last two pairs of ribs (11^{th} & 12^{th})
Through costal cartilages, they are attached to the front of the sternum	Not connected to sternum

2. **Do the muscles pull the structures, or push them? Explain briefly.**

Solution:

Muscles do not push, they pull the structure.

Every muscle has two ends – a fixed end where the muscle originates and a movable end which pulls some other part. The movable end is shorter and thicker and hence pulls the bone at the movable end. Muscles can only contract and relax, they cannot lengthen or elongate.

The movable end is projected out to form a tough structure referred to as a tendon which is attached to the bone. When a muscle is triggered by a nerve, contraction of the muscle occurs and it becomes thicker and shorter which causes the bone to be pulled at the movable end.

3. **Just as the humerus corresponds to femur, what bones correspond to tarsals, metacarpals, ulna and radius respectively?**

Solution:

Bones	Related/Corresponding bones
Example: Humerus	Femur
Tarsals	Carpals
Metacarpals	Metatarsals
Ulna	Fibula
Radius	Tibia

4. **What are antagonistic muscles? Give one example.**

Solution:

A structure that has been moved by a muscle cannot return to its original position without the action of another muscle. Such muscles causing opposing movements are called as antagonistic muscles.

Example:

The flexor muscles or the biceps of the upper arm bends the lower arm over the upper arm (flexes). Extension of the lower arm is caused by the extensor muscles or the triceps. Hence these two muscles are antagonistic or work in the opposite direction.

5. **Some people in old age complain of stiff joints. What do you think could be a possible reason for it?**

Solution:

Some people in old age complain of stiff joints because of the decline in the amount of synovial fluid between the bones. Joints such as knee joint, shoulder joint necessitate to be securely held in their positions in order to be lubricated well. These joints possess synovial fluid which is a lubricating (loosening) fluid which act as a cushion between the bones and taking away friction while movements. As we get older, the movement of the joints tend to get stiffer with reduced flexibility as the synovial fluids decreases and the cartilage gets thinner. Furthermore, joints tend to get stiffer as the ligaments also shorten and lose some flexibility.

D. Long Answer Type

1. **What are the uses of the skeleton in our body?**

Solution:

Listed below are the benefits of the skeleton in the body:

- Support and shape – Skeleton renders a definite framework to all the delicate parts of the body and provides a definite shape.
- Protection – Few significant and delicate organs are well protected by a bone casing. Example – The skull provides protection to the delicate brain.
- Movement – Some bones are movable on each other which is brought about by the action of muscles that originate on one bone and are inserted into another.
- Leverage – Levers are formed by some joints and bones which causes the increase in the

speed and distance of the muscle movement.

- Blood cells formation – Few blood cells such as RBC and WBC are formed in the marrow of certain long bones.
- Bones store phosphorus and calcium for the entire body and are referred to as the storehouse of the same.

2. Name the different types of joints? Give one example of each type.

Solution:

The different types of joints are as follows:

- Immovable joints – Example: Bones of the skull box
- Partially movable joints - Example: Joints between the ribs and breast-bone
- Freely movable joints - Example: Hip joint
- Gliding joint – Example: Ankle bones
- Pivot joint - Example: Joint between axis vertebrae and atlas
- Hinge joint - Example: Joint between finger bones and toes
- Ball and socket joint - Example: Shoulder joint

3. What is the difference between ligament and tendon? (On the basis of their function).

Solution:

Listed below are the differences on the basis of their function:

Ligament	Tendon
Ligaments stabilize joints	Tendons pass tensile forces to the bones from muscles
Avert chances of dislocation	Responsible to cause the muscles to stay intact with parts of the skeleton
They connect two or more bones thus acting as a mediator between them	It connects muscle to a bone, thus acting as connectors.

4. What are bones made of? Are the bones living or non-living? Give reason.

Solution:

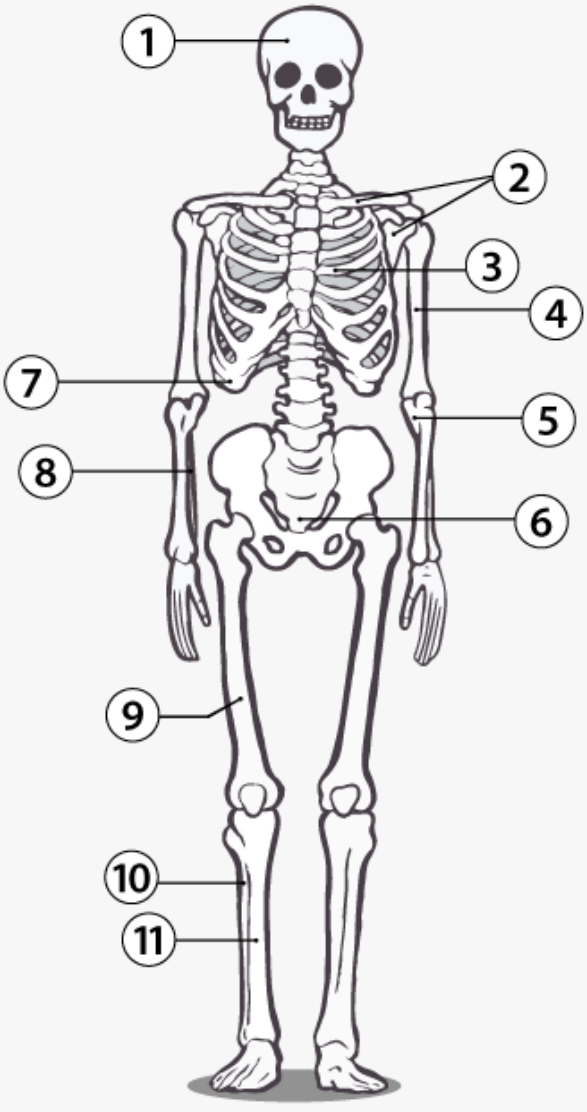
Bone is a connective tissue and are strong, hollow, hard and non-flexible structures. They appear as a greyish-white tissue and are made of two-thirds of inorganic substances which includes minerals such as phosphorus, calcium, carbonates etc. while one-thirds of it is composed of organic substances.

Structure of the bone –

- Its outer surface is known as periosteum which is a thin, dense membrane which consists of an outer fibrous and inner cellular layer, blood vessels and nerves which nourish the bone.
- The consecutive layer is composed of compact bone which is greatly calcified. It is extremely rigid and hard connective tissue which causes the bone to appear as smooth, solid and white.
- The mid layer is composed of bone cells known as osteocytes which are arranged as concentric circles which are implanted in a hard matrix composed of collagen fibre and mineral deposits.
- The interior hollow cavity of the long bones contains bone marrow responsible for synthesizing blood cells.

Bones are living tissues when located in the body of a living person. Once out of the body, the cells of the bones die and hence are termed dead as they turn non-functional.

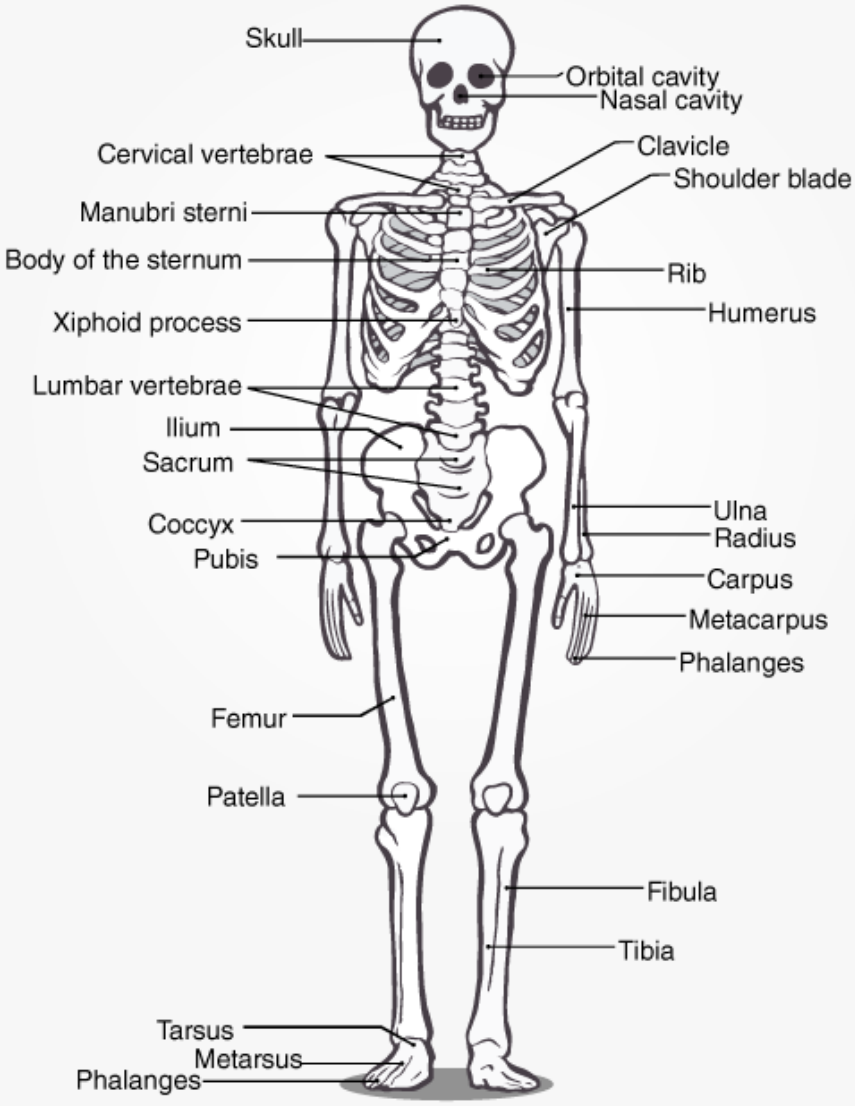
5. Given below is a diagram of human skeleton. Name the bones numbered 1-11.



The human skeleton

Solution:
1 – Skull/Cranium
2 – Clavicle
3 – Sternum
4 – Humerus
5 – Ulna

6 – Coccyx
7 – Ribs
8 – Radius
9 – Femur
10 – Fibula
11 – Tibia



The human skeleton