

TENDER HEART SCHOOL, SEC 33B, CHD

CLASS VIII

DATE 30.09.24

SUBJECT BIOLOGY

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CHAPTER 12 - Skeleton - Movement and Locomotion

This lesson is of Class 8 for the subject of Biology.
Topic Human Skeleton which is covered in Chapter 12.
Skeleton - Movement and locomotion starting on Page-117
of your text book titled Concise Biology - Selina
Publications and is being submitted to you on 30.09.24

Skeleton and its functions

Most animals are characterised by a definite shape and capacity for movement and locomotion. These functions are performed by the skeleton and muscles together.

The general functions of skeleton are as follows-

1. Support and Shape Skeleton is a rigid framework that provides mechanical support to the body and helps to maintain the shape of the body.

Fig 1 shows - Skeleton provides shape to the body.

2. Protection Skeleton protects the delicate organs of the body. For Eg Skull protects the brain, vertebral column protects the spinal cord and so on.

3. Movement & Locomotion is brought about by the joint activity of bones and muscles. Many bones are joined to each other in a manner that one bone can be moved on another. Contraction and relaxation of the muscles which are joined on one end to one bone and to other bone on the other end brings about the movement.

Fig 2 - Movement in body parts - activity of bones & muscles

4. Leverage Parts of the skeleton acts as levers on which the muscles can pull. Thus some bones and joints form lever [a simple machine] that increase the speed and distance of movement by a muscle. Fig. 3 depicts - Lever actions in skeleton

5. Storage Skeleton serves as store house of minerals such as calcium and phosphorus

6. Formation of blood cells Bone marrow of long bones form red blood cells and white blood cells.

Constituents of skeleton Human skeleton consists of -

- i. Bones that form rigid frameworks that provides mechanical support and shape to the body
2. Cartilage is made up of hard tissue and provide supporting and connecting structures Example cartilage is present in ear pinna and nose tip.
3. Ligaments connect bone to a bone and hold them in position.

STRUCTURE OF BONE and its composition.

Bone consists of organic and inorganic material

If organic part of bone is removed -

If bone is strongly heated the organic component of bone is destroyed and only the inorganic part [or ash] will remain. Such a bone turns brittle and quickly breaks. With age organic part of bone is reduced in old people, hence the bones become fragile taking much time to rejoin in case of a fracture

If inorganic part of bone is removed - Inorganic part of bone includes compounds of Calcium and Phosphorous. If a bone is placed in weak hydrochloric acid, the mineral part of bone gets dissolved in acid and the remaining organic framework is left behind. Such a bone is called decalcified bone i.e. bone from which calcium has been removed. Such a bone is soft and flexible which can even be tied into a knot.

CLASSIFICATION OF BONES ON BASIS OF SHAPE

1. LONG BONES consists of a shaft with a swollen end/knob at each end. Eg bones of arms, legs etc.
2. SHORT BONES are box like, and spongy. These bones show little movement. Eg ankle, wrist.
3. FLAT BONES are expanded into broad flat plates of compact bones enclosing spongy bone. Eg Skull, sternum, shoulder blade.
4. IRREGULAR BONES vary in shape and structure. These bones are compact and spongy. Eg Facial bones, vertebral bones.

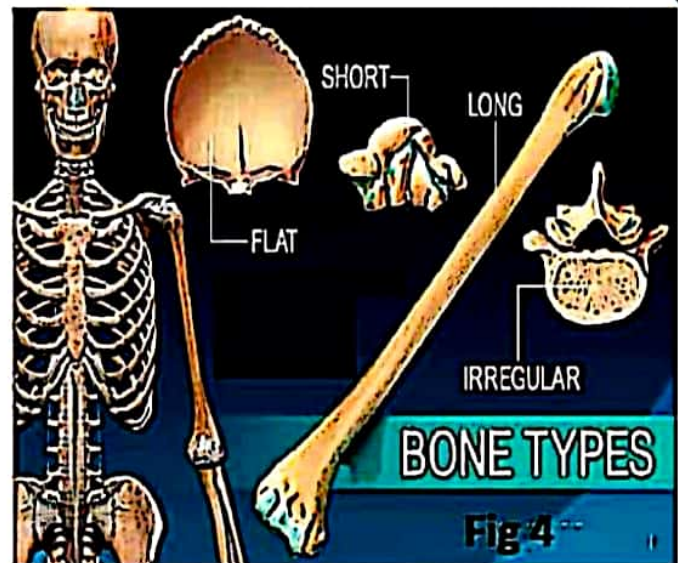
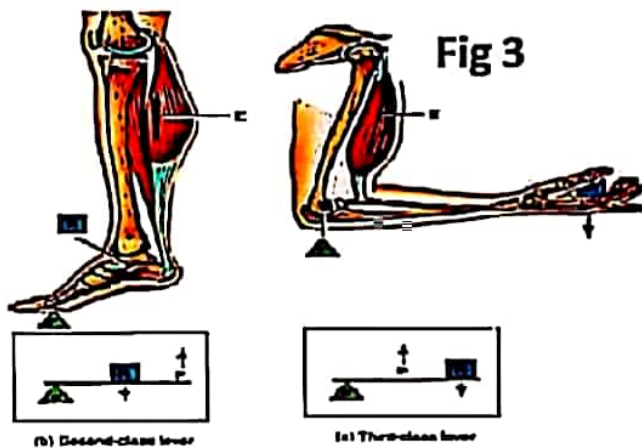
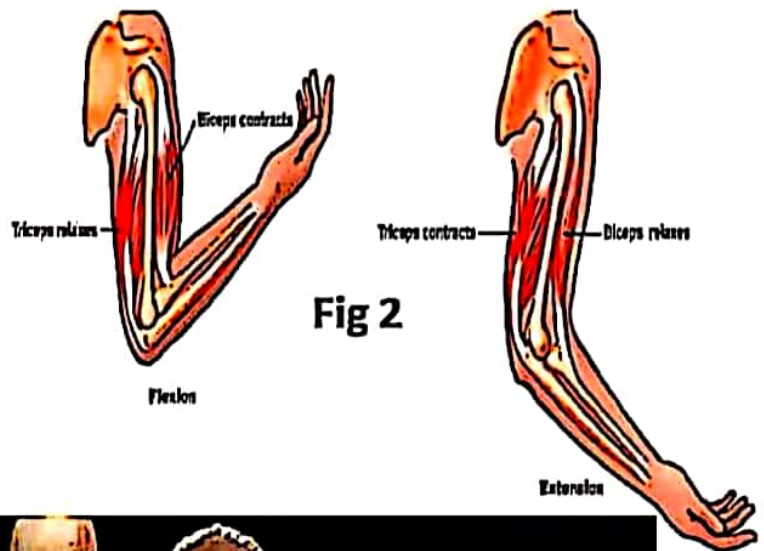
Fig 4 shows different types of bones.

Now before going further in the chapter let us recapitulate quickly what we have learnt so far.

Answer the following questions

- Q1 Name two minerals present in the bones.
- Q2 State one location where cartilage is present.
- Q3 Name 4 types of bones on the basis of shape.

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Now students you may write down the answers

in notebook

A1 Calcium and Phosphorous are minerals present in bones.

A2 Cartilage is present in ear pinna

A3 4 types of bones on basis of shape are
Long Bones, Short Bones, Flat bones and
Irregular bones.

STRUCTURE OF A TYPICAL LONG BONE

Bone is highly calcified or mineralised [i.e. with deposits of minerals] hard and rigid connective tissue. It consists of living bone cells called osteocytes which are arranged in form of concentric rings embedded in ground matrix in which collagen fibres and mineral salts [i.e. calcium and phosphorous] are deposited.

Fig 5 shows structure of bone tissue and bone cell

Bone is externally protected by a membranous covering called periosteum which consists of outer fibrous and inner cellular layers. Bones have good supply of blood vessels and nerves.

A long bone has a hollow cavity in the middle which is filled with bone marrow.

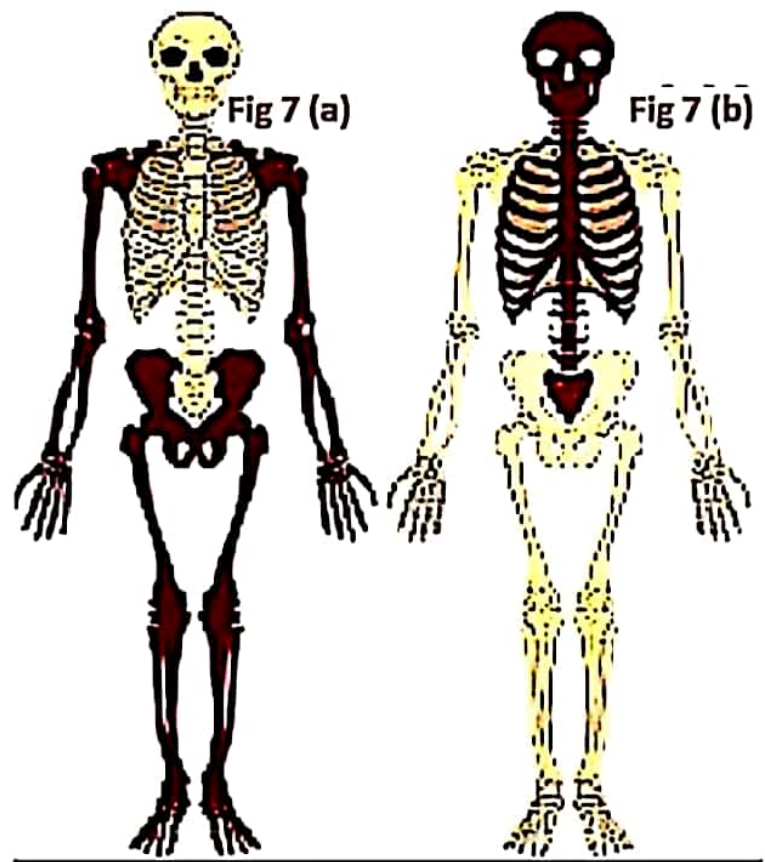
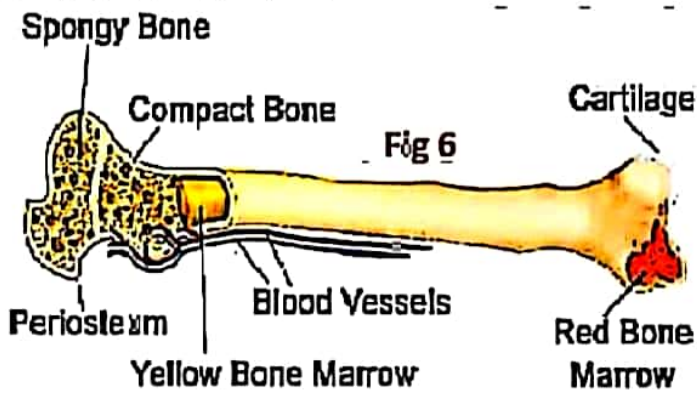
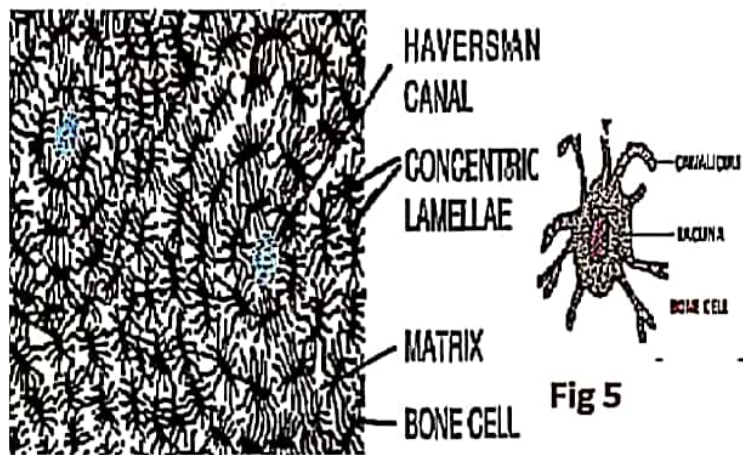
Marrow is of 2 types.

i Yellow marrow is made up of adipose tissue and blood vessels which give rise to white blood cells.

ii Red marrow is present at the ends of bones and produce red blood cells.

Fig 6 shows structure of a Typical bone

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HUMAN SKELETON consists of 206 bones.

Skeleton has 2 main divisions

- i Axial skeleton - which includes the basic central framework of the body. It consists of the skull, the vertebral column, the ribs and the sternum
- ii Appendicular skeleton - which includes the bones of limbs and girdles. Hence appendicular skeleton has bones of forelimbs, hindlimbs and girdle [i.e. the parts of skeleton which help to join the limb bones to the main axial skeleton].

Fig 7(a) Axial skeleton system 7(b) Appendicular skeleton system
Children details of these two divisions of human skeleton we will do in the next class. Kindly go through the notes carefully and with reference to the detailed explanation of the topics you are required to answer the following home assignment questions in the notebooks -

HOME ASSIGNMENT

Q1. Answer the following 'Review questions' given at the end of the chapter

B Very Short answer type

Q No 2

D Long answer type

Q No 1

Q2. Draw a well labelled diagram of structure of a Typical Bone

THANK YOU