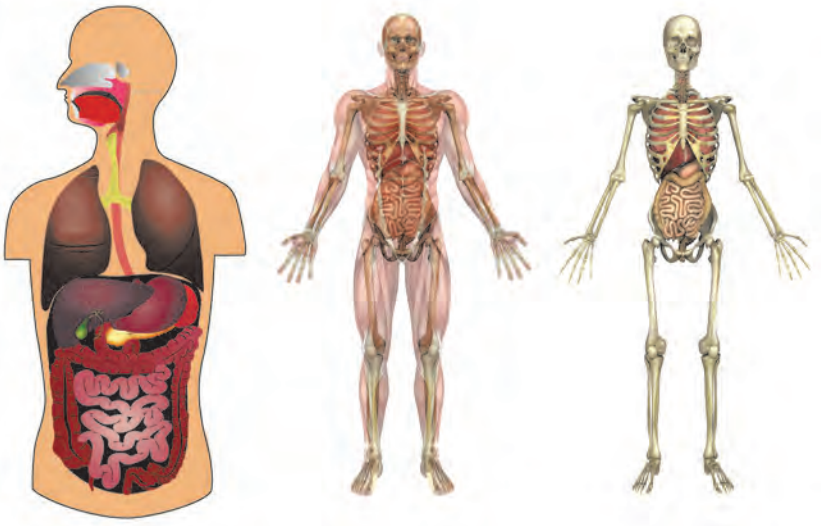
8. Our Skeletal System and the Skin

Can you recall?

Which organ systems do you see in the figure alongside?

In the previous classes, we have learnt about some organ systems, their functions and their locations in our body. With the help of that, complete the following table.



8.1 : Organ systems and the human skeleton

Name of the organ	Function of the organ	Body cavity
Heart		
Lungs		
Intestines		
Brain		

The various organs are safe within the body cavity. The human skeleton is a protective shell for all the internal organs.

Sometimes when we fall while playing or have an accident, a bone in our arm or leg may get broken. This is called a **'fracture'** of the bone.

A fracture in a bone causes severe and unbearable pain and the part with the broken bone swells immediately.

Can you tell?

Your friend meets with an accident and a bone in his leg is fractured. How will you help?

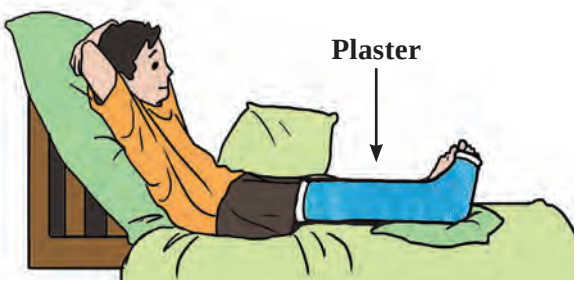
8.2 : A boy with a fractured bone

After an accident, prevent any movement of the fractured part. Immobilize it and get immediate medical help. After going to the hospital, an 'X-ray' image is taken of the part which is swollen.

'X-rays' were discovered by Wilhelm Conrad Roentgen.

A fractured bone

8.3 : An X-ray image



An X-ray image shows whether a bone is broken and also the exact spot where it is broken. This helps in providing the proper treatment.

Let's try this.

Let's identify our bones.

(1) Place your hand at the centre of your chest and your friend's back.

(2) What is the name of the hard part you feel on placing your hand on your chest?

(3) Do you feel some hard bumps on the back? What are they called?

(4) What difference do you notice between the bones of the back and those of the chest?

The human skeletal system

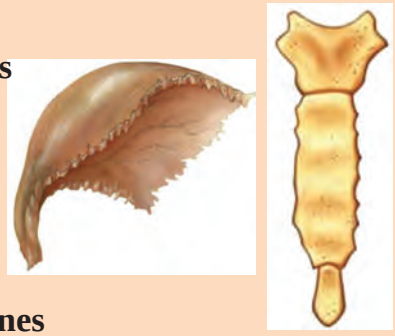
All the bones in our body are not of the same shape. Every bone is different. All the bones together form a framework or skeleton. The skeleton gives a shape to the body.

All the bones of the body along with cartilage together form the skeletal system.

Bones are hard. They are not flexible. Bones are composed of two main constituents. Bone cells are biotic, while calcium carbonate, calcium phosphate, minerals and salts are the abiotic constituents of bones. Calcium imparts strength to the bones.

Types of Bones : Bones of our body are classified into four types.

1. Flat bones



2. Small bones

3. Irregular bones

4. Long bones

The system which gives a definite shape to the body, provides support and protects the delicate organs inside the body is the skeletal system.

Can you tell?

Can you identify the animals from the pictures of their skeletons?

8.4 : Skeletons of various animals

Try this.

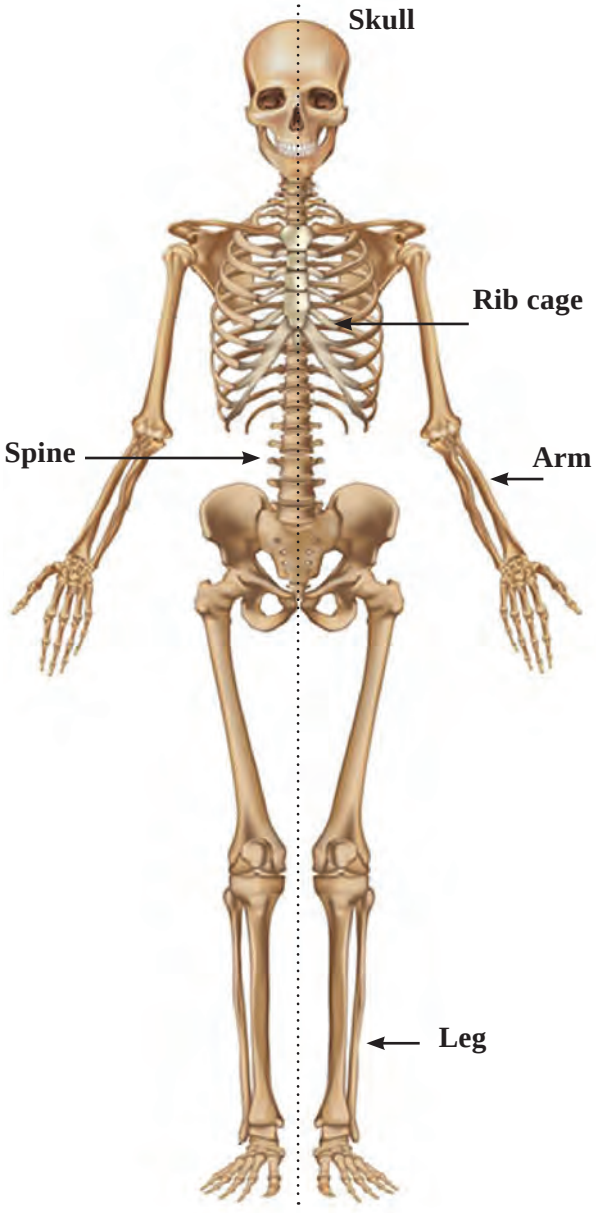
Take a measuring tape and measure the length of the bones of your arms and legs. Do the same for your friend/ sister/ brother. Record the measurements in the table below and compare them.

Bones	Length of bones in cm.			
	Self	Friend	Brother	Sister
1. Arm bones				
2. Leg bones				

The human skeletal system can be divided into two parts : the axial skeleton and the appendicular skeleton.

The axial skeleton consists of the skull, the spine and the rib cage. These are situated symmetrically along the central vertical axis of the body.

The appendicular skeleton is made up of the bones of the upper and lower limbs (arms and legs) on either side of the central axis.



8.5 : Parts of the human skeletal system

As our body grows, the size and length of our bones increases. Such changes in size and length can be seen in children according to age. However, the body continues to grow only up to a certain limit. The bones of taller people are longer.

The axial skeleton

Skull : The skull is formed by the bones of the head and face. The bones of the skull are flat and strong. There are altogether 22 bones in the skull, 8 in the head and 14 in the face. Except for the lower jaw, none of the bones of the skull can move.

Which organs of our body does the skull protect?

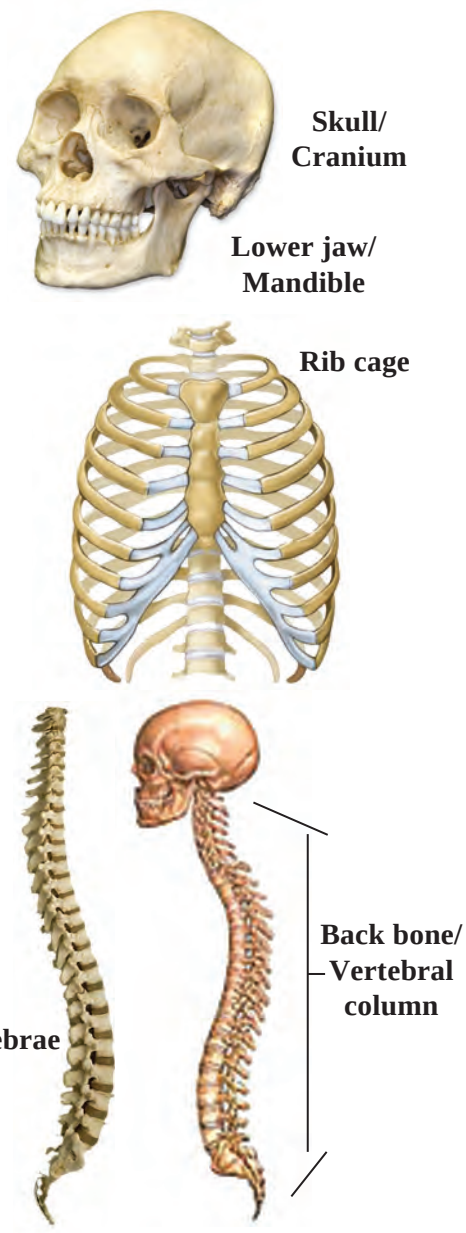
Rib cage : Feel the left and right sides of your chest with your hand or finger. How many bones can you feel altogether on the two sides?

Check in the centre. How many bones do you feel?

The cage-like structure in the chest is calld the **rib cage**. In the chest, there is one vertical, flat bone called the **sternum**. Twelve pairs of flat bones called ribs are joined to it sideways. These 25 bones form the rib cage. It is joined to the spine at the back.

The Spine (Backbone or Vertebral Column) : The spine is formed by padlock-shaped bones placed straight one above the other. There are altogether 33 bones in the spine, each called a vertebra. These bones are arranged one above the other flexibly. The spine protects the spinal cord that originates from the brain.

What would have happened if we didn't have a backbone?



8.6 : Skull, rib cage and spinal column

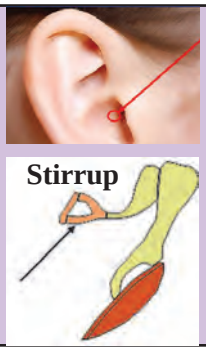
The appendicular skeleton

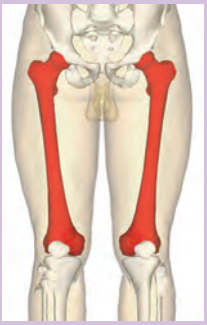
The human body has two arms and two legs. The different parts of the arms and legs have several bones, which are connected together by joints.

Do you know?

There are three bones in each of the ears. Of these, the stirrup is the smallest bone in our body. It is as small as a grain of rice and is hollow. Its shape is like that of a stirrup.

In the human body, the longest and strongest bone is the thigh bone or the **femur**.





Observe and discuss.

Observe a human skeleton in your school laboratory or a picture of the skeleton and classify the bones in our body into four types. Discuss the functions of these bones.

Try this.

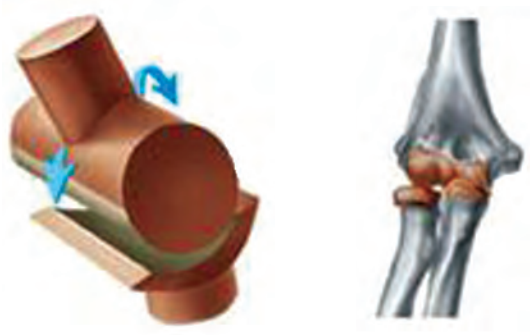
Move the different parts of your body from the head to the toes and observe the different places at which they can bend or turn.

The bones in our body are connected to each other by means of ligaments.

Joints : Joints are the places where two or more than two bones are connected to each other. Joints are of two types.

Joints

Movable Joint	**Immovable Joint**
Bones can move. Examples : bones of arms and legs	Bones cannot move. Example : bones of the skull. (Other than the lower jaw)



Hinge joint

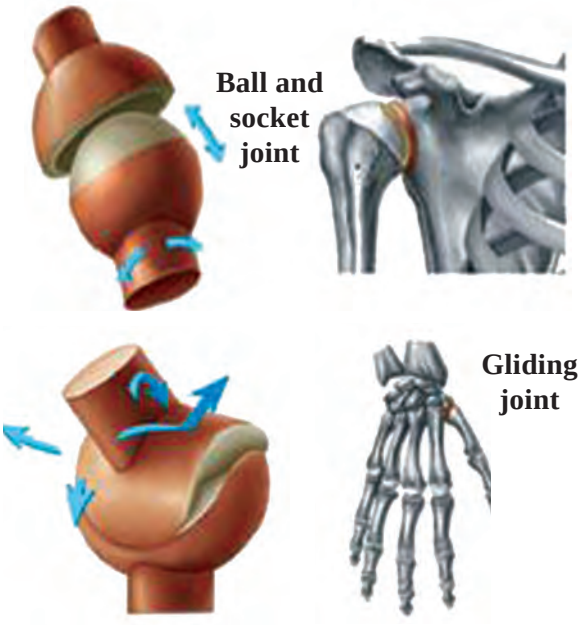
Types of joints

Let us study some types of movable joints.

1. Hinge joint : This type of joint allows the movements of bones only in one direction. It moves in a 180^0 angle. Examples : the elbow and knee joints.

2. Ball and socket joint : In this type of joint, the bones can move in two or more directions – in a 360^0 angle. Examples : shoulder and hip joints.

3. Gliding joint : In this type of joint, the bones can only slide over each other. Examples : wrist and ankle joints.



8.7 : Some types of joints

Can you recall?

Which organ helps us to sense whether something is hot or cold, rough or smooth, etc.?

The skin

The skin is an important and large organ of all living things. The skin has hair. There are nails on the skin at the tips of the fingers and toes. The skin gives us the sense of touch. The skin is an important sensory organ of the body.

The outermost covering of the body is called skin.

The structure of the skin

Human skin is made up of two main layers. The outermost layer is called the **epidermis** and the layer below it is called the **dermis**. Below the dermis, there is a network of blood vessels and nerve fibres. The subcutaneous layer under this network maintains normal body temperature. The epidermis has various layers.

Can you tell?

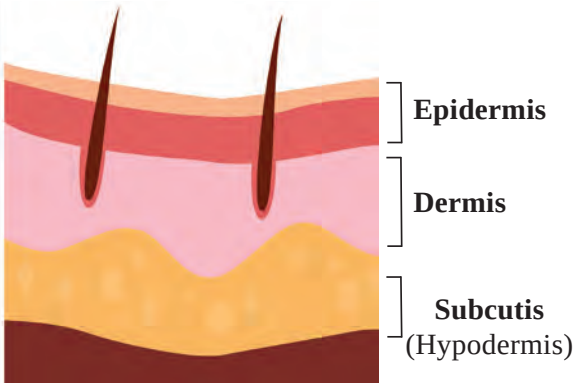
What happens when we walk or play in the hot sun?

When we walk or play in the sun, we get tired, but at the same time our skin becomes wet. This is because of **sweat**. In the skin, there are glands which secrete sweat. They are called **sweat glands**.

After playing in the hot sun or after hard physical labour, the temperature of the body rises. Then sweat is released. It helps to reduce the temperature of the body. Our body temperature usually remains constant at approximately 37^0C.

Functions of the skin

1. Protecting the internal parts of the body like muscles, bones, organ systems, etc.
2. Help preserve the moisture in the body.
3. Synthesizing vitamin 'D'.
4. Releasing sweat to regulate body temperature.
5. Giving protection from the heat and cold.
6. The skin functions as the sensory organ of touch.



8.8 : Structure of the skin

Melanin

A pigment called melanin is present in the cells of the epidermis. The melanin is synthesized in certain glands in the skin. The percentage of melanin decides the fairness or darkness of the skin. The colour of the skin also depends on the climate. Melanin protects our skin and the inner parts from ultraviolet sunrays.

Use your brain power!

1. Which colour of the skin will give greater protection from the sun's rays?
2. How does sweating help to lower the temperature of the body?

Observe and discuss.

Observe your skin and the skin of your grandmother, grandfather or any old people in the house.

What difference do you notice?

As we grow older, the proportion of fat beneath the skin reduces. However, the previously taut skin does not shrink. This causes wrinkles on the skin of older people.

Do you know?

It is melanin that determines the colour of our hair, too. Jet black hair is due to pure melanin, while brown, lighter hair is due to sulphur in the melanin and reddish hair, due to iron in the melanin.

Always remember...

For the health of our skin, it is important to keep it clean.

Discriminating between people based on their skin colour is unscientific and wrong. Avoid the temptation of using artificial means to become fair.

What we have learnt–

- All the bones in the body along with the cartilage together form the skeletal system.
- The skeleton gives shape and support to the body.
- The outer covering of the body is called the skin.
- The skeletal system and the skin perform the important function of protecting the body and the internal body parts.
- We must take care of our skeletal system and skin.
- The skull, the rib cage, the backbone and the bones of the arms and legs are the main parts of the human skeletal system.
- Epidermis and dermis are the two main layers of the human skin.

Exercise

1. Fill in the blanks with the proper word.

(a) The place where two or more bones are connected is called a ..... .

(b) Cells of the epidermis contain a pigment called ..... .

(c) ..... and ..... are the two layers of the human skin.

(d) The human skeletal system is divided into ..... parts.

2. Match the pairs.

'A'	'B'
(1) Ball and socket joint	(a) Knee
(2) Hinge joint	(b) Wrist
(3) Gliding joint	(c) Shoulder

3. Right or wrong? If wrong, write the correct sentence.

(a) Bones are soft.

(b) The human skeleton protects the internal organs.

4. Put a ☑ mark at the proper places.

(a) The system which gives a definite shape to our body.

- ☐ Excretory system
- ☐ Respiratory system
- ☐ Skeletal system
- ☐ Circulatory system

(b) The ..... joint is seen in fingers and toes.

- ☐ Hinge joint
- ☐ Ball and socket joint
- ☐ Immovable joint
- ☐ Gliding joint

5W2LL4

5. Answer the following questions in your words.

(a) What are the functions of your skin?

(b) What should you do to keep your bones strong and healthy?

(c) What are the functions of the human skeletal system?

(d) Which are the various reasons due to which our bones might break?

(e) What are the different types of bones? How many types are there?

6. What will happen if – ?

(a) There are no joints in our body.

(b) There is no melanin pigment in our skin.

(c) Instead of 33 vertebrae in our body, we had one single and straight bone.

7. Draw diagrams.

(a) Types of joints

(b) Structure of the skin

Activity :

- Collect pictures of the different parts of the human skeletal system and paste them on chart paper. Write the functions of each, too.
- Collect the pictures, newspaper cuttings, etc. which show the skeletal systems of various animals and observe the differences between them.