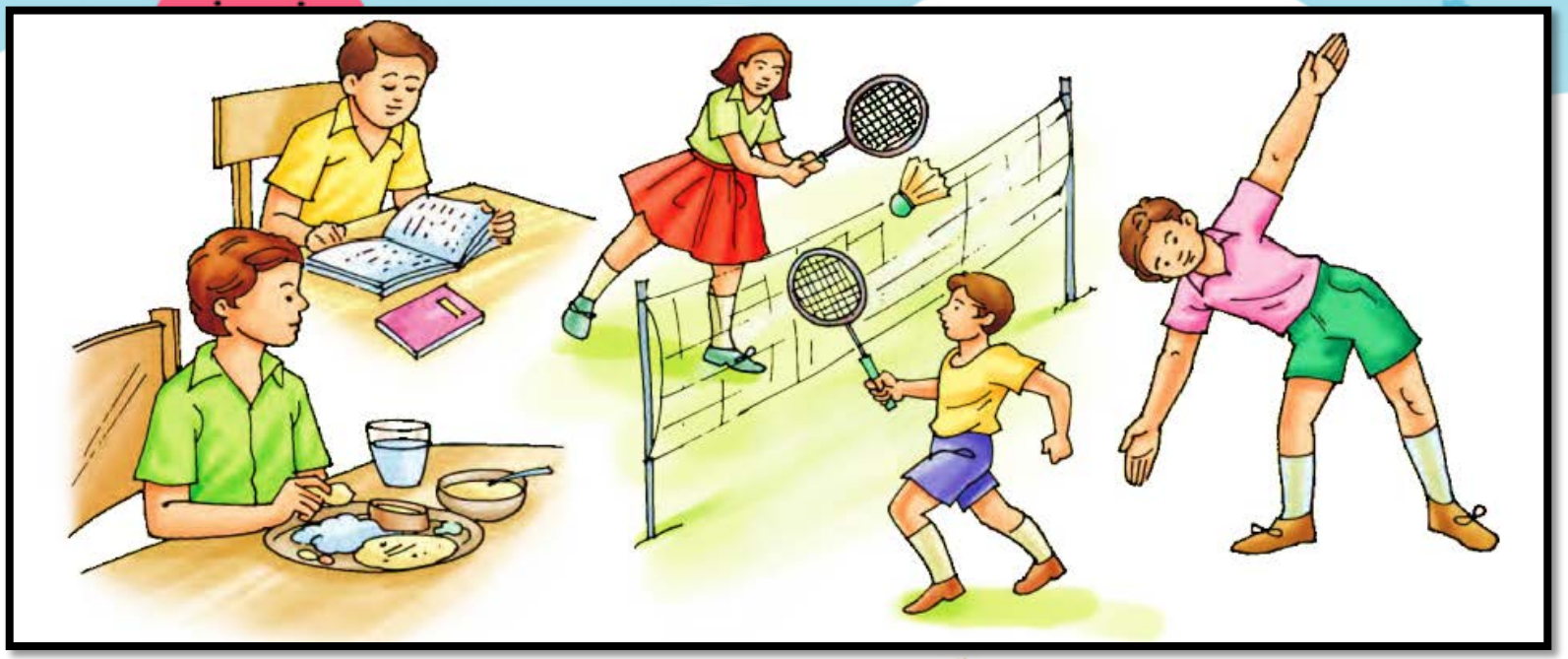
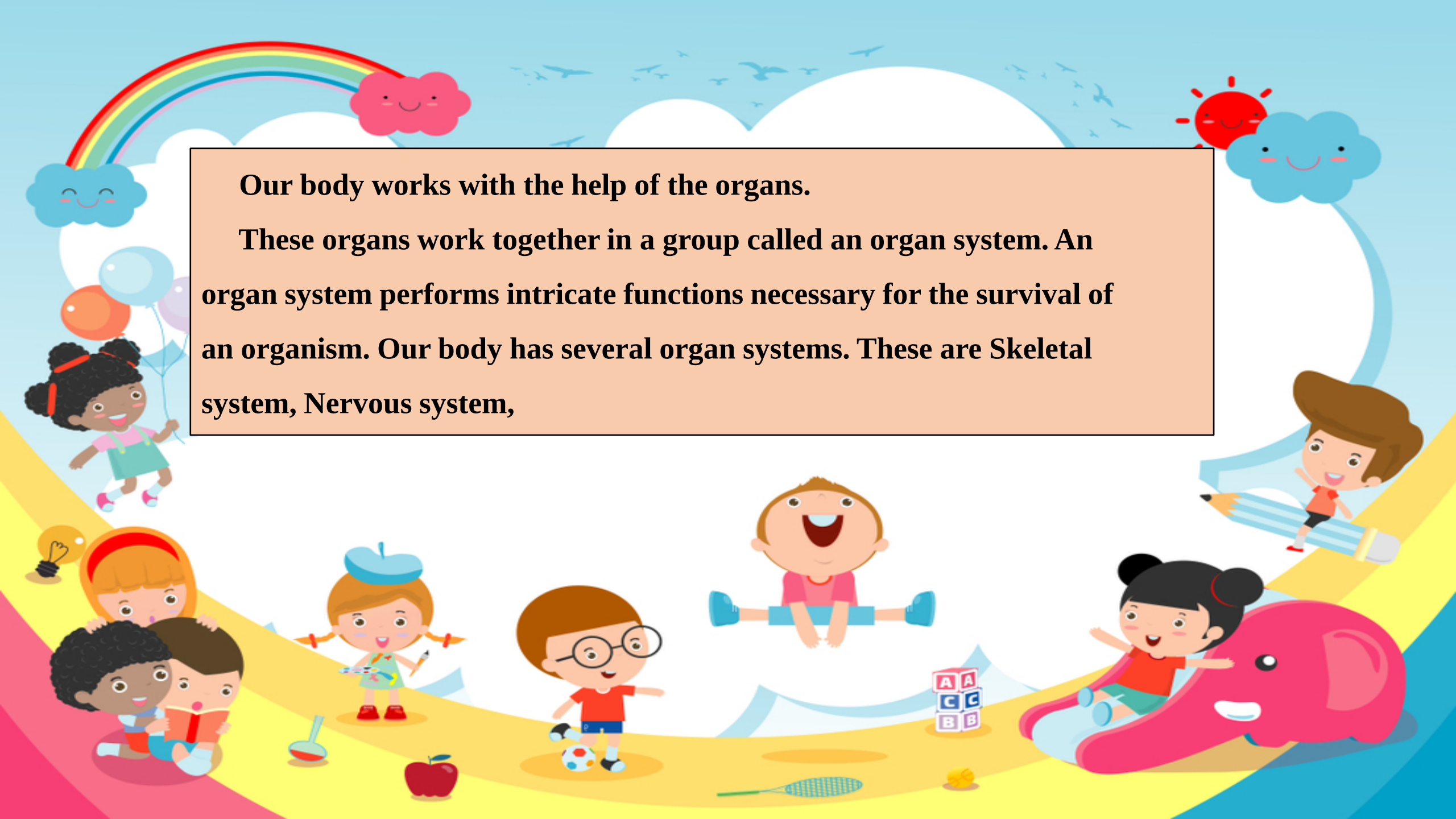
9 - Skeletal and Muscular System

Class – 5

E.V.S

Have you ever thought how your body works? Do you think how we are able to perform a number of functions, simultaneously?

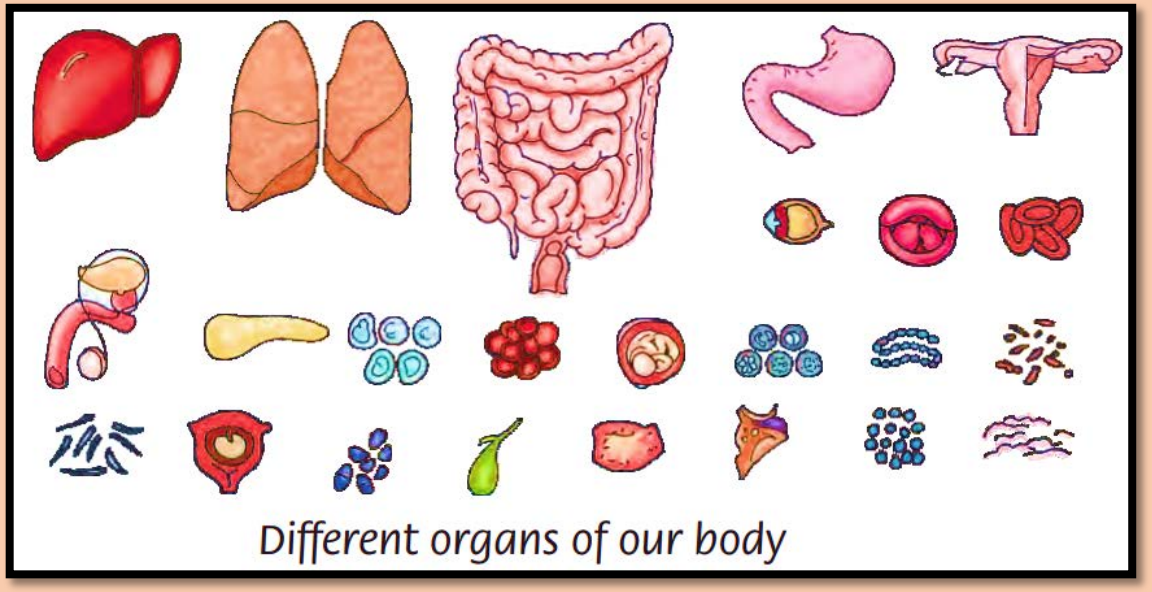




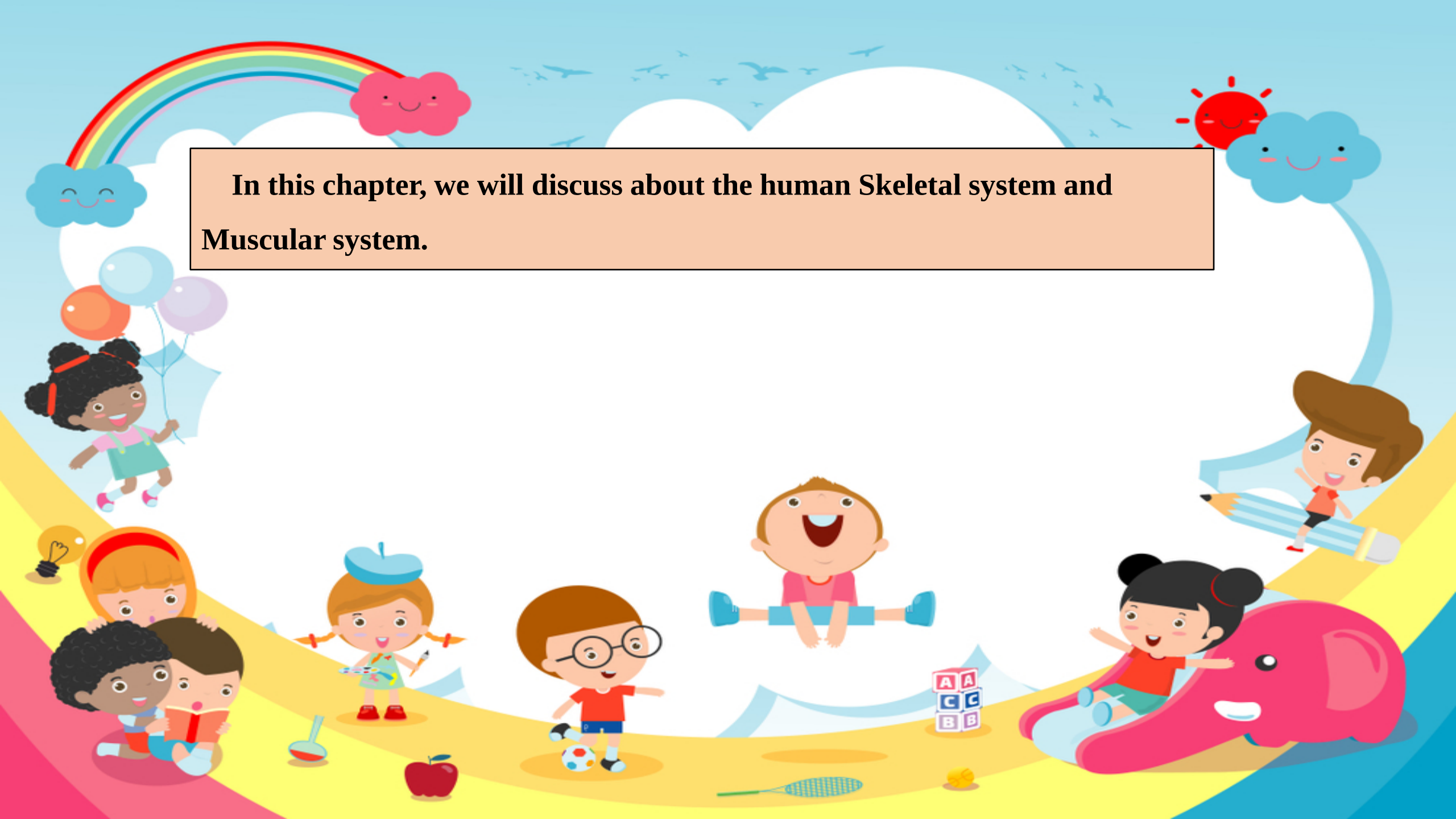
Our body works with the help of the organs.

These organs work together in a group called an organ system. An organ system performs intricate functions necessary for the survival of an organism. Our body has several organ systems. These are Skeletal system, Nervous system,

Circulatory system, Immune System, Muscular system, Digestive system and Respiratory system. These organ systems work together to maintain a constant internal environment.



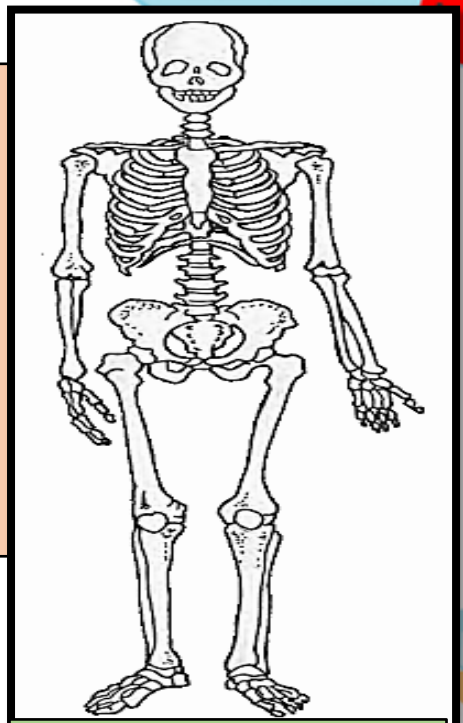
Every system has its own specific function. For example, Digestive system helps in the digestion of food, Respiratory system enable us to breathe, Immune system helps our body to fight against disease and Muscular system provides strength to us.



In this chapter, we will discuss about the human Skeletal system and Muscular system.

SKELETAL SYSTEM

Skeletal system is the basic structure of bones, which provides support to our body. Its function is to protect the internal organs which remain enclosed in the frame of skeleton. It also gives strength and shape to our body.



Human skeleton

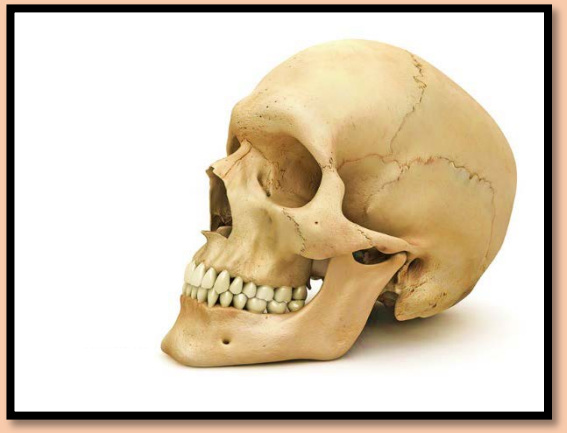
Our skeletal system consists of bones of different size and shape. They are skull, backbone, rib cage and two pairs of limbs—fore-limbs (arms) and hind-limbs (legs). Limbs are attached with girdles—shoulder girdle and hip girdle.

DID YOU KNOW

- An adult human has 206 bones of different size and shape.
- A new born baby has 270 bones which get fused with the age.

Skull

Skull is the bone present in our head. It is made of 22 bones. Out of these 22 bones 14 are the facial bones which enable us to eat and talk as these bones make the lower jaw movable. The remaining 8 bones are interlocked together and protect the delicate brain, by enclosing it.



Human skull

Backbone

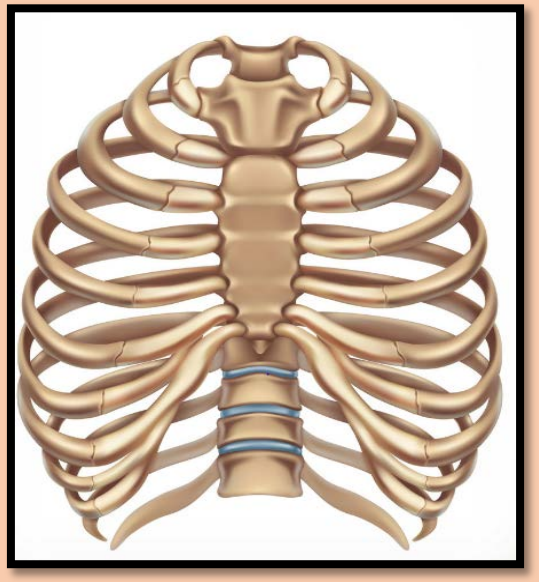
Backbone is also known as spine. It is the main axis of the skeleton. Skull remains attached to it.

Spine is made of small 33 bones which are collectively known as vertebrae and the strong column formed by these bones is known as vertebral column. Inside the vertebral column, spinal cord is present which is protected by this column.

Backbone

Rib Cage

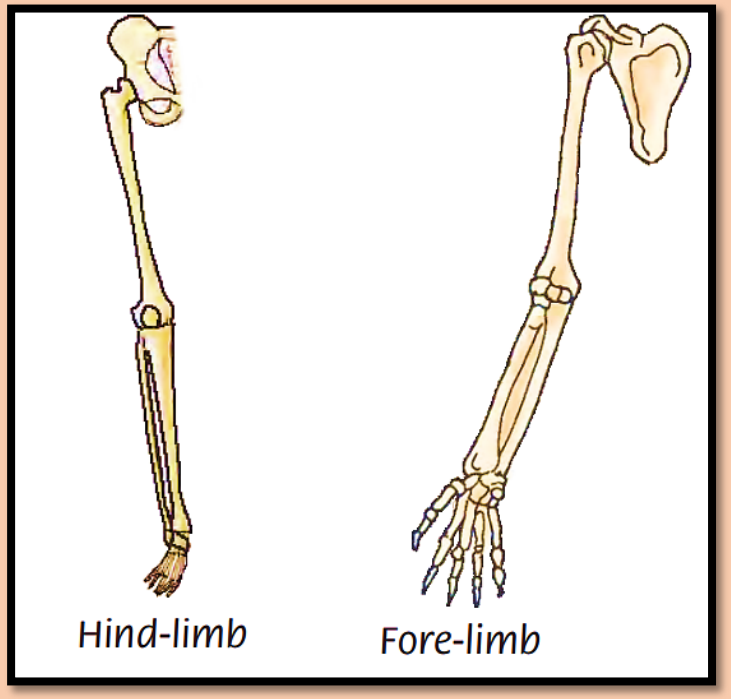
Rib cage is present in the chest cavity. It is made of 12 pairs of bow shaped ribs which together form a cage-like structure. As it is present in the chest, it protects the heart and the lungs enclosed in it. These curved bones are joined with the backbone and the breast bone but the lowest two pairs are joined with the backbone only. These lowest two pairs are known as the floating ribs.



Rib cage

Limbs

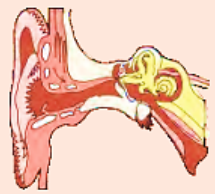
There are two pairs of limbs: the fore-limbs and the hind-limbs. Fore-limbs are commonly known as **arms** and the hind-limbs are known as **legs** .These limbs are joined with two types of girdles. Arms are joined with the shoulder girdle and the legs are joined with the hip girdle. Shoulder girdle consists of a collar bone and the shoulder blades.



Hip girdle consists of femur bone which fits in it with the help of ball and socket joint. This is connected with the lower leg at knee joint. Femur bone is hollow from inside and is filled with bone marrow. Hip bones are very strong and carry the whole weight of the body.

DID YOU KNOW

- Femur is the longest bone in our body.
- Stapes bone which is present in the middle of ear is the smallest one.



Stapes bones

Femur

Functions Of The Skeletal System

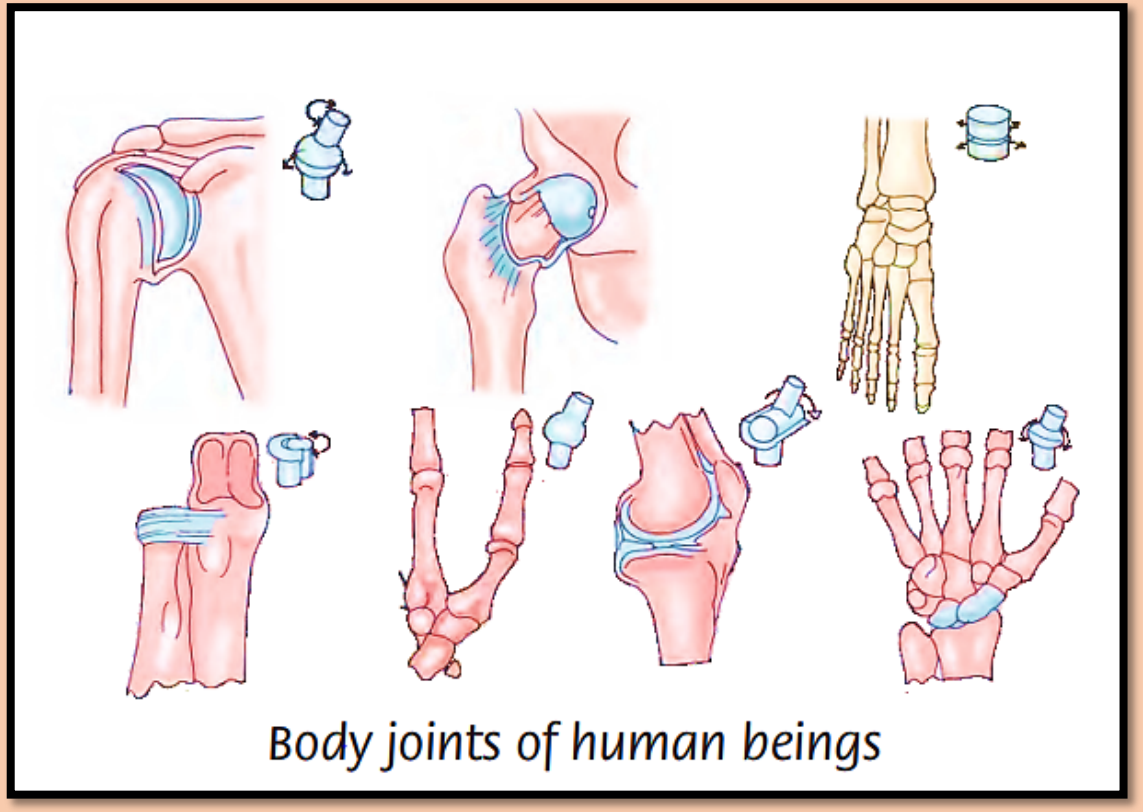
Skeletal system of human, serves the following functions:

1. **Skeletal system provides the framework, which supports the body and maintains its shape.**
2. **Joints between bones permit movements in the body.**
3. **Skeletal system protects many vital organs of our body, for example skull protects brain, eyes and the middle and internal ears. Rib cage protects heart and lungs.**
4. **Some bones of the skeletal system are the site of production of blood cells, e.g. femur bone.**
5. **Bones also store calcium in the matrix.**
6. **Some bones release specific chemicals which regulate the blood sugar and fat deposition.**

JOINTS

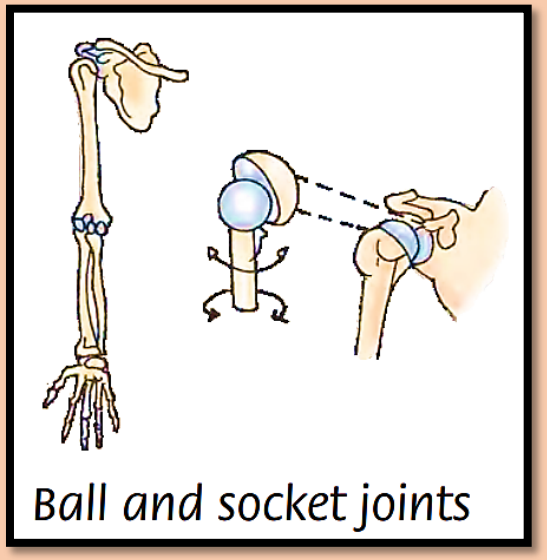
A **joint** is the location at which two or more bones connect. They are made to allow the movement and provide mechanical support. The two bones are held together with the help of strong tissues called **Ligaments**.

There are following types of joints found in the human skeleton:



Ball and Socket Joint

The widest range of movement is provided by a "ball and socket" joint, in which the spherical head of one bone lodges in the spherical cavity of another. This type of joint is found in the shoulder joints and the hip joints.

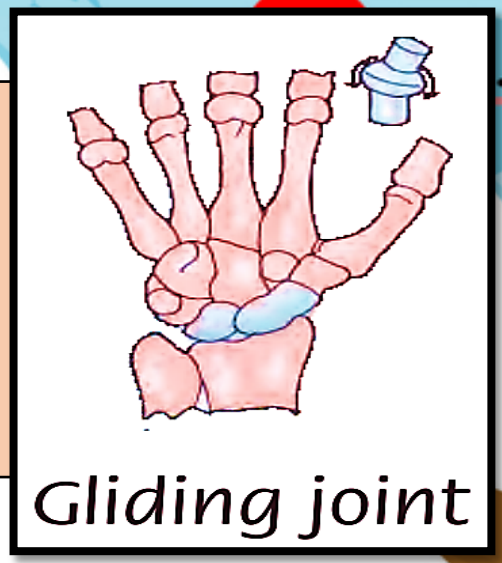


Hinge Joint

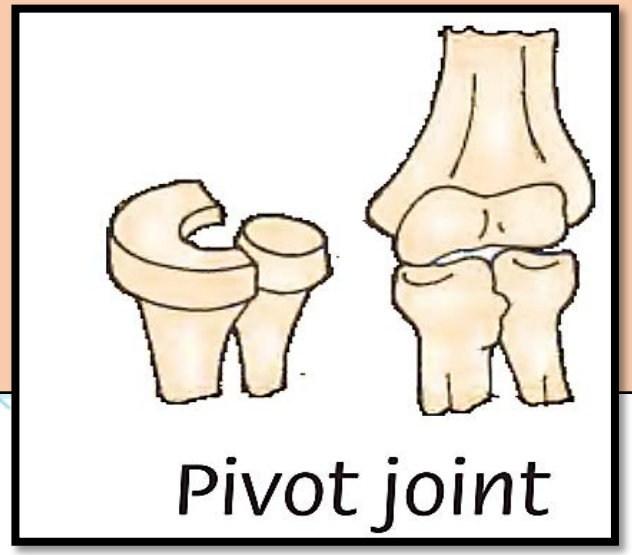
“Hinge” joint is a very simple joint. It is found in the elbows, knees and the joints of the fingers and toes. Hinge joint allows movement in only one direction.

Gliding Joint

“Gliding” joint permits the movements of the bones to short distances over the surface of each other. This type of joints are found between the various bones of the wrist and ankle.



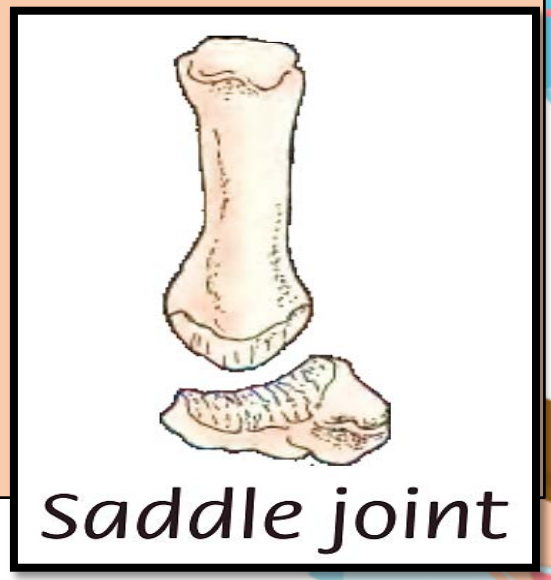
Pivot Joint



Pivot joint permits rotation only. This joint is found in the neck between the first two vertebrae. Head rotates from side to side on this type of joint called the axis.

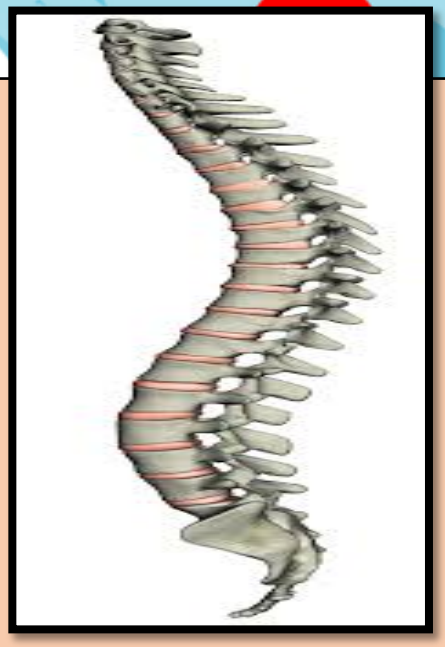
Saddle Joint

A “saddle” joint is more versatile than either a hinge joint or a gliding joint. It allows movement in two directions. Saddle joint gives the human thumb the ability to cross over the palm of the hand.



Spine and Vertebrae

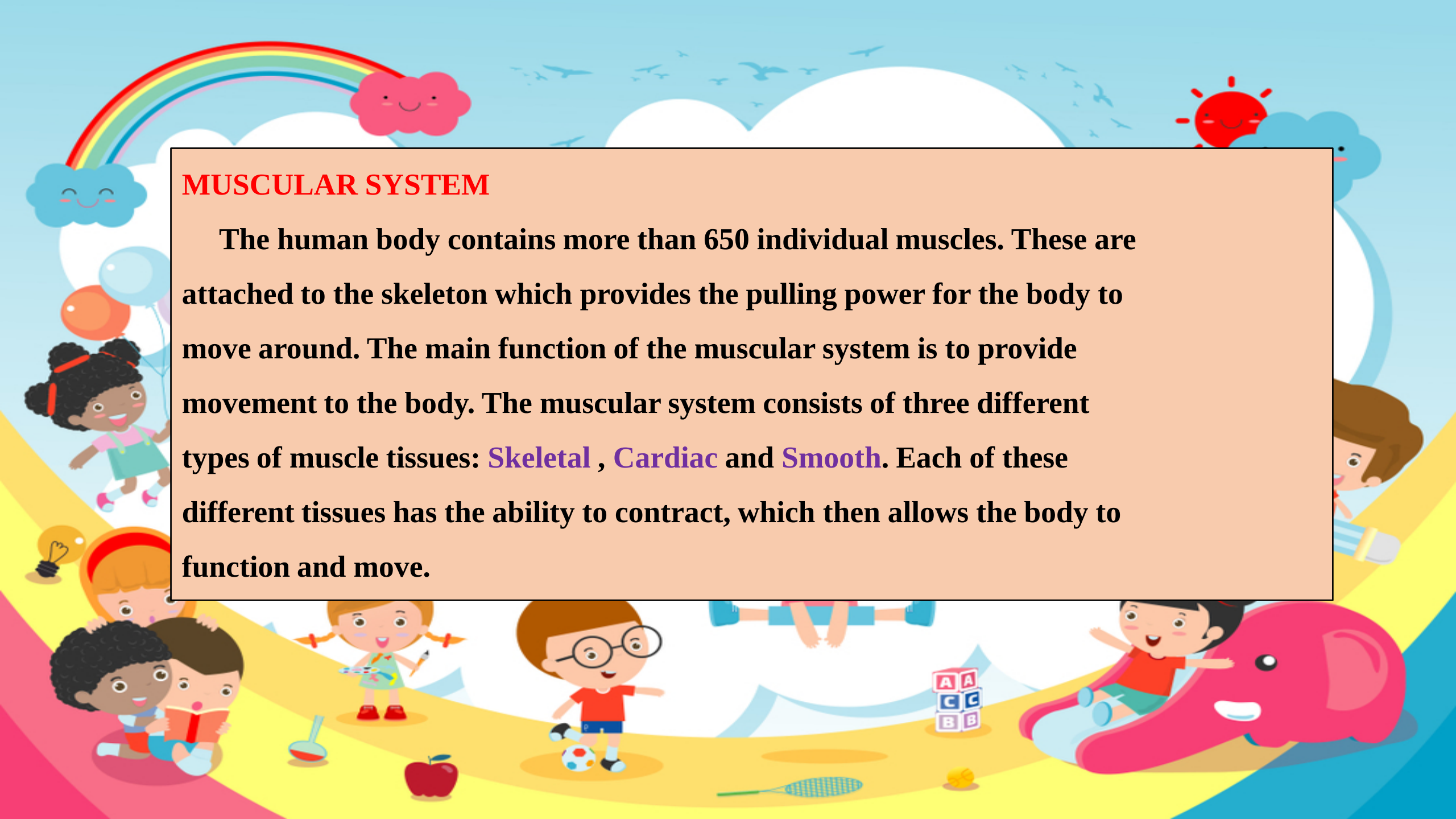
Spine is a column of bones and cartilages that extends from the base of the skull to the pelvis. It encloses and protects the spinal cord and supports the trunk of the body and the head. Spine is made of approximately thirty-three bones called vertebrae. Each pair of vertebrae is connected by a joint which stabilizes the vertebral column and allows it to move.



Spine

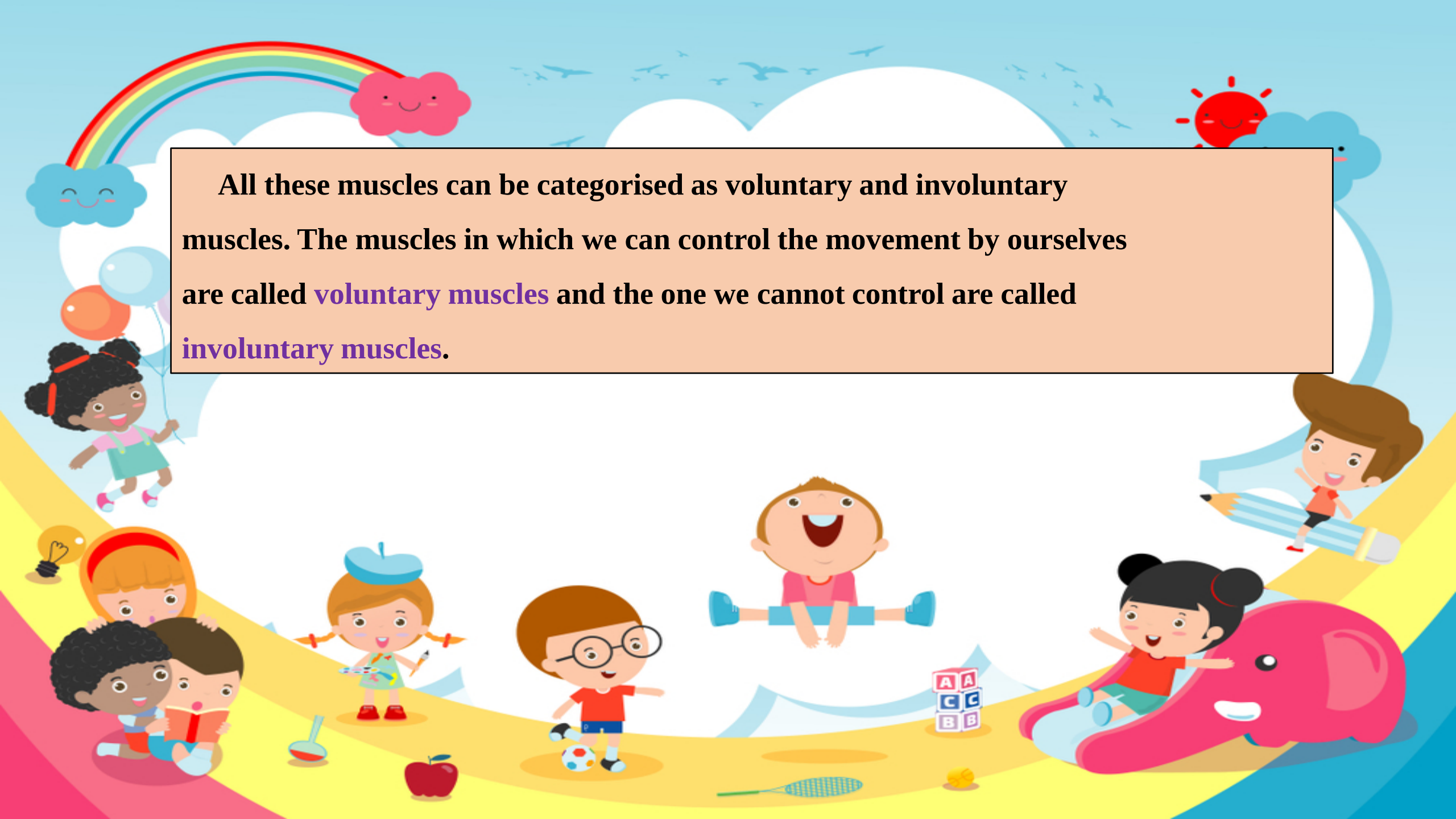
DID YOU KNOW

- Joints in the skull are immovable because bones present in it are interlocked with each other. This joint is called suture joint.
- Joints which are movable require some lubricant to reduce the friction in between. Therefore, a fluid is present between the joints.



MUSCULAR SYSTEM

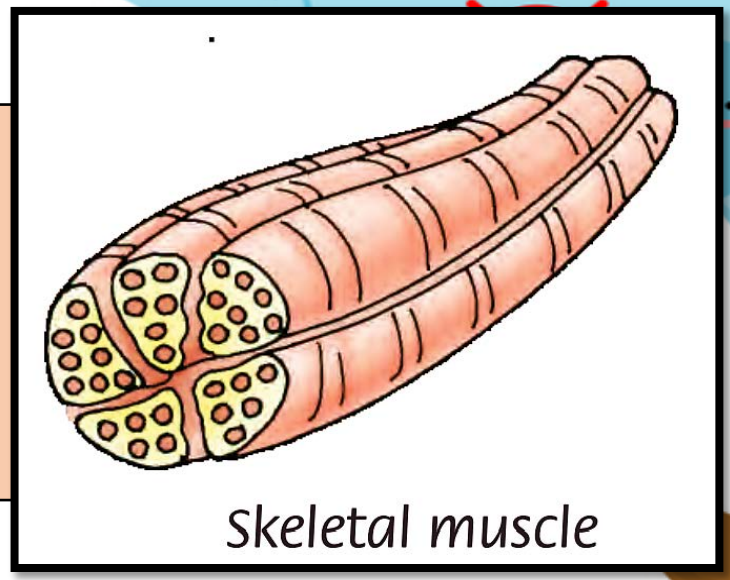
The human body contains more than 650 individual muscles. These are attached to the skeleton which provides the pulling power for the body to move around. The main function of the muscular system is to provide movement to the body. The muscular system consists of three different types of muscle tissues: Skeletal , Cardiac and Smooth. Each of these different tissues has the ability to contract, which then allows the body to function and move.



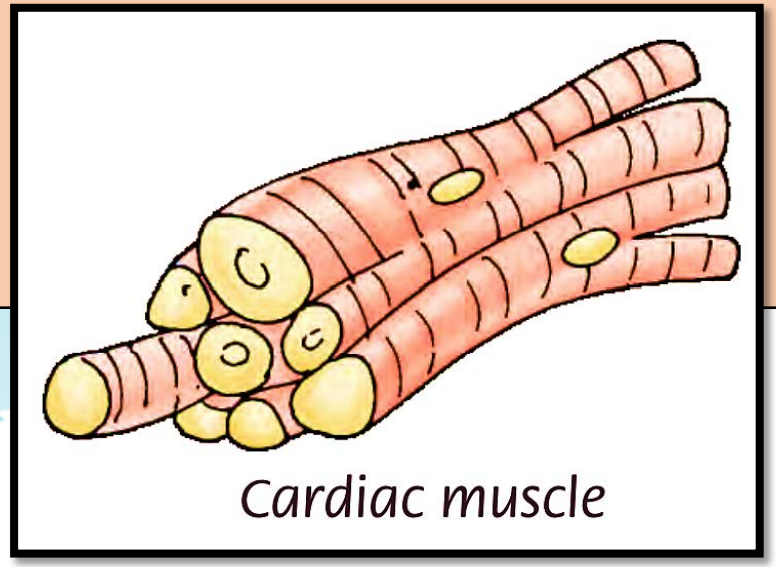
All these muscles can be categorised as voluntary and involuntary muscles. The muscles in which we can control the movement by ourselves are called **voluntary muscles** and the one we cannot control are called **involuntary muscles**.

Skeletal Muscle

These are voluntary muscles found in skeleton. Their contraction serve to move various bones and cartilages of the skeleton.



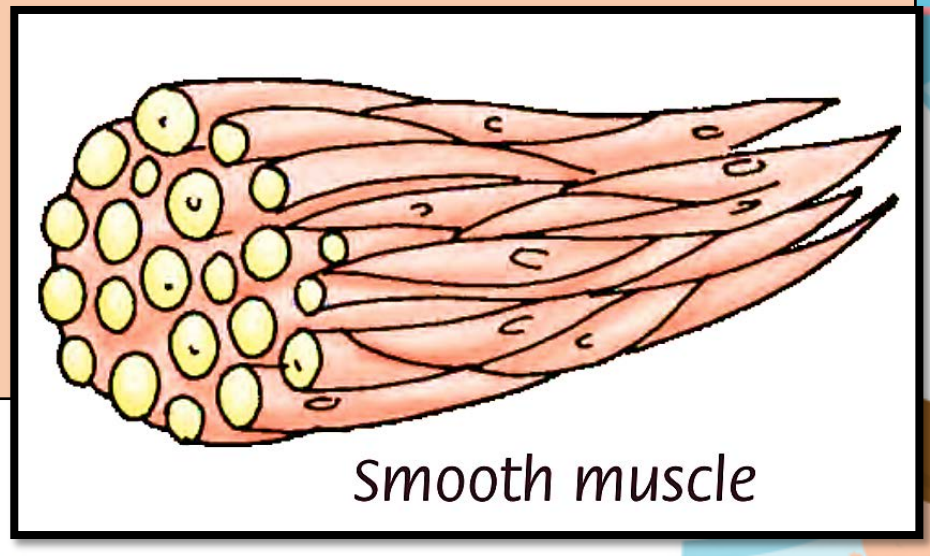
Cardiac Muscle



These muscles compose the heart. These are involuntary muscles. They are controlled by the brain and itself.

Smooth Muscle

These are also involuntary muscles found in the skin, internal organs, reproductive system, major blood vessels and excretory system.

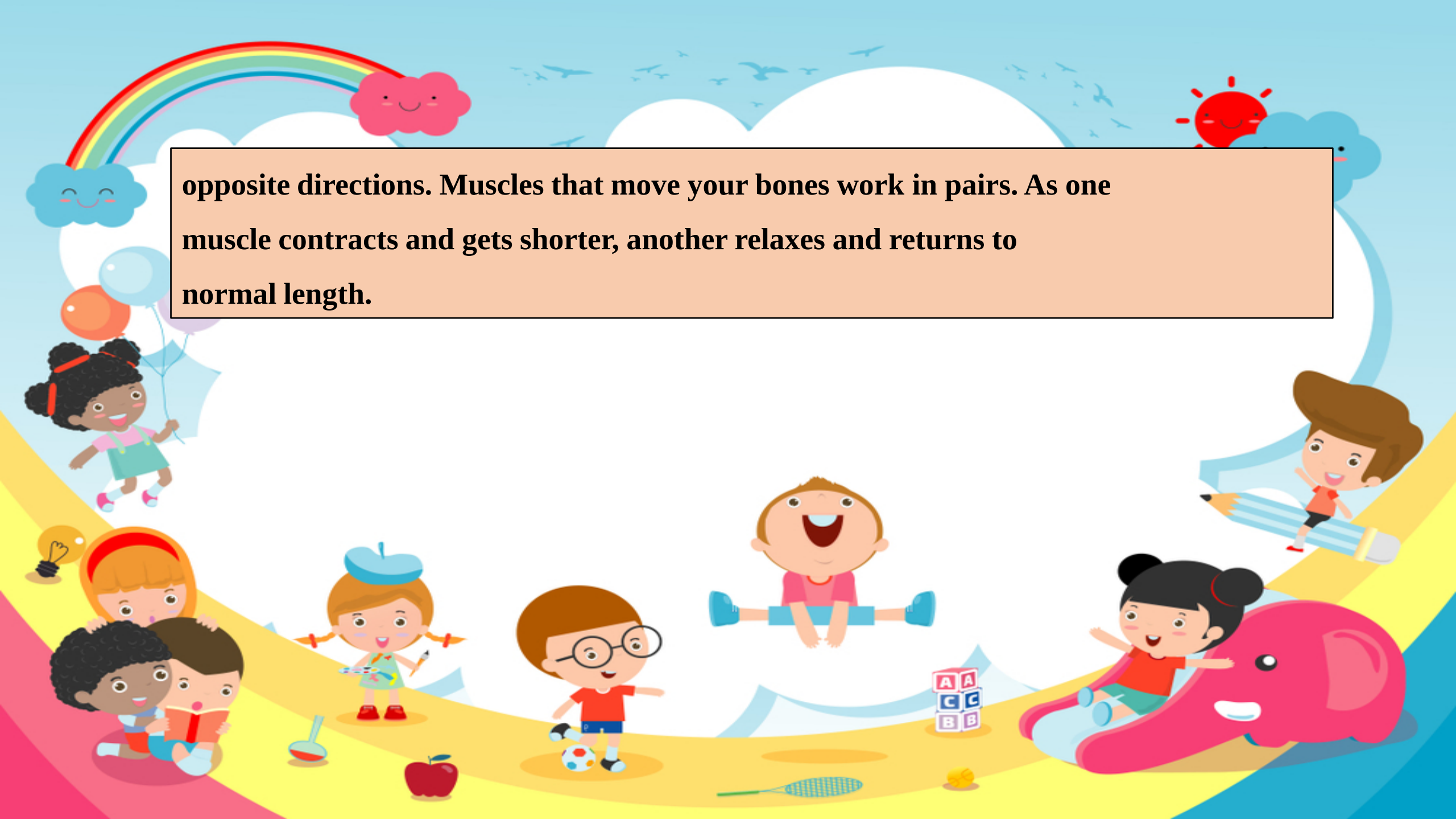


Working Of Muscles

Muscles are responsible for our body movement. Muscles keep our gut from sagging and our lungs pounding. They keep our heart beating continuously. Muscles are more than movers. Muscles also produce heat which keeps our body warm. If you leap or bend, it is the result of your muscle action. Muscles become

smaller when contract and larger when relax. Muscles produce movement by pulling against the bone. Even when you push against a wall, the muscles in your body are working by pulling. When the muscles relax they stop pulling. More than one muscles work in each joint and they pull in

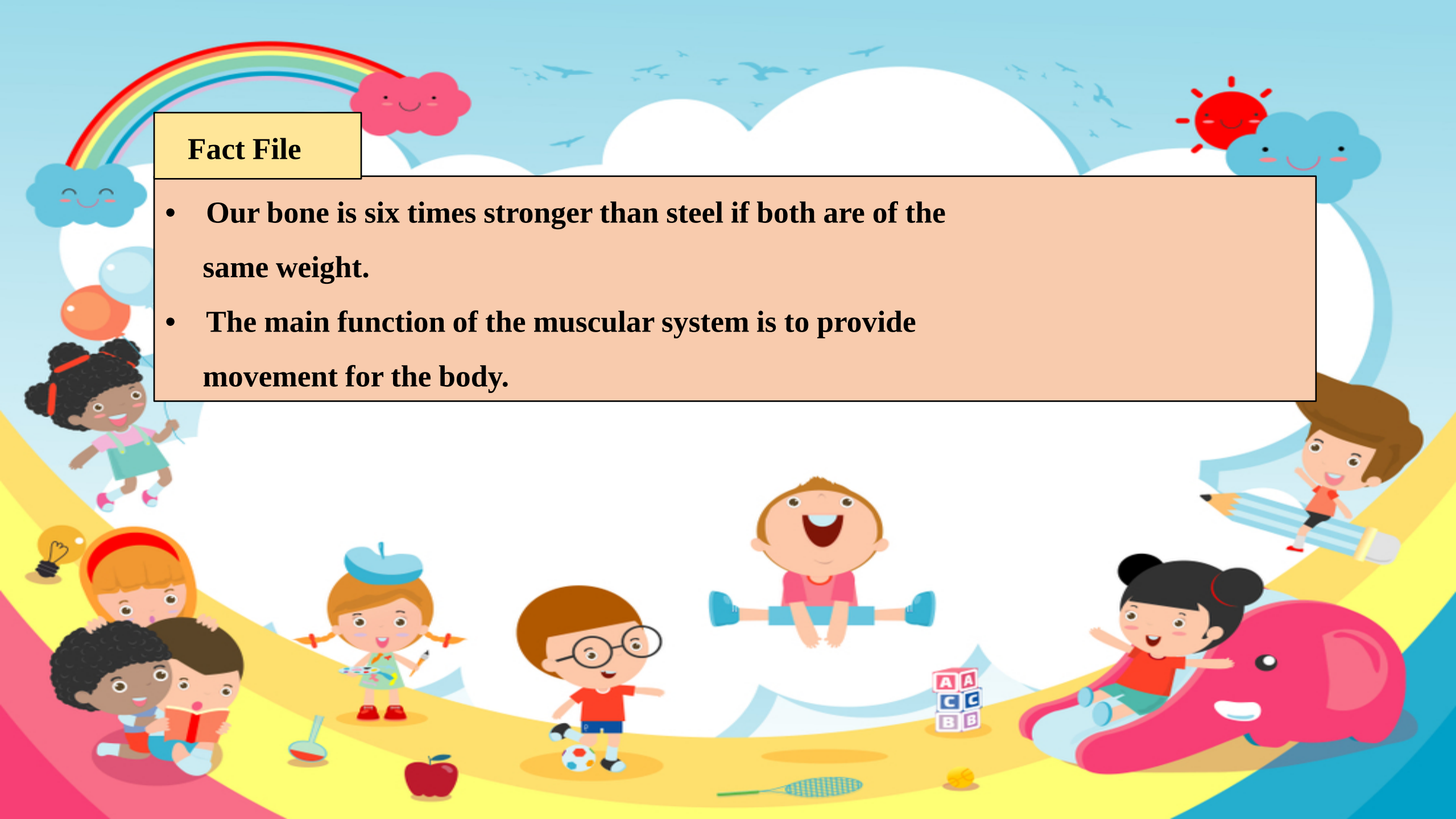
opposite directions. Muscles that move your bones work in pairs. As one muscle contracts and gets shorter, another relaxes and returns to normal length.




Muscles work all the time to help you keep your balance and to move your head, back, arms, legs and other parts.

Fact File

- Our bone is six times stronger than steel if both are of the same weight.
- The main function of the muscular system is to provide movement for the body.



Things to Remember

- **Skull is made of 22 bones.**
- **Backbone is also known as spine.**
- **There are two pairs of limbs. These are the fore-limbs and the hind- limbs.**
- **Femur is the longest bone in our body.**
- **A joint is the location at which two or more bones make contact.**


THANK YOU