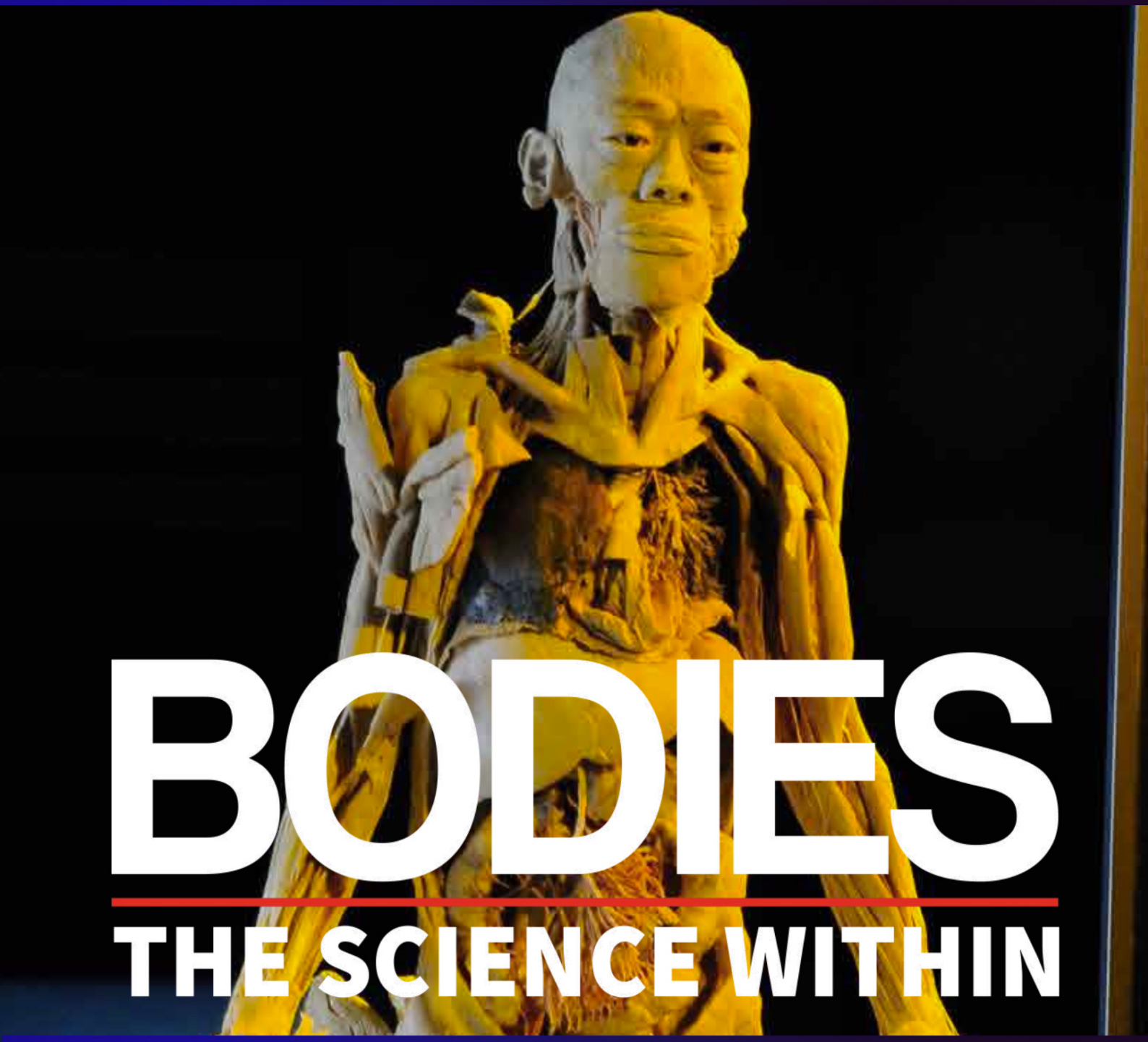
# TEACHING GUIDE

## Ten years and younger

AUREA EXHIBITIONS



# BODIES

## THE SCIENCE WITHIN

# LEARNING GOAL

Recognize and explain that living things are made up of one or more cells and that these cells are organized into tissues, organs and systems.

## KNOWLEDGE

l. The skeletal system is made up of _____ (Number) bones.

2. The functions of the skeletal system are:

_____, _____, _____

_____, _____, _____

3. The ulna and radius are bones that are located in the limb _____ ___

4. Which organ of the nervous system is protected by the bones of the skull?

_____

5. The muscular system is made up of more than _____ (Number) muscles.

6. What is the main function of the muscular system?

_____

7. Name the 3 types of muscle tissue.

_____, _____, _____

8. Explain what is the relationship between the muscular and skeletal systems during movement of the human body?

_____

_____

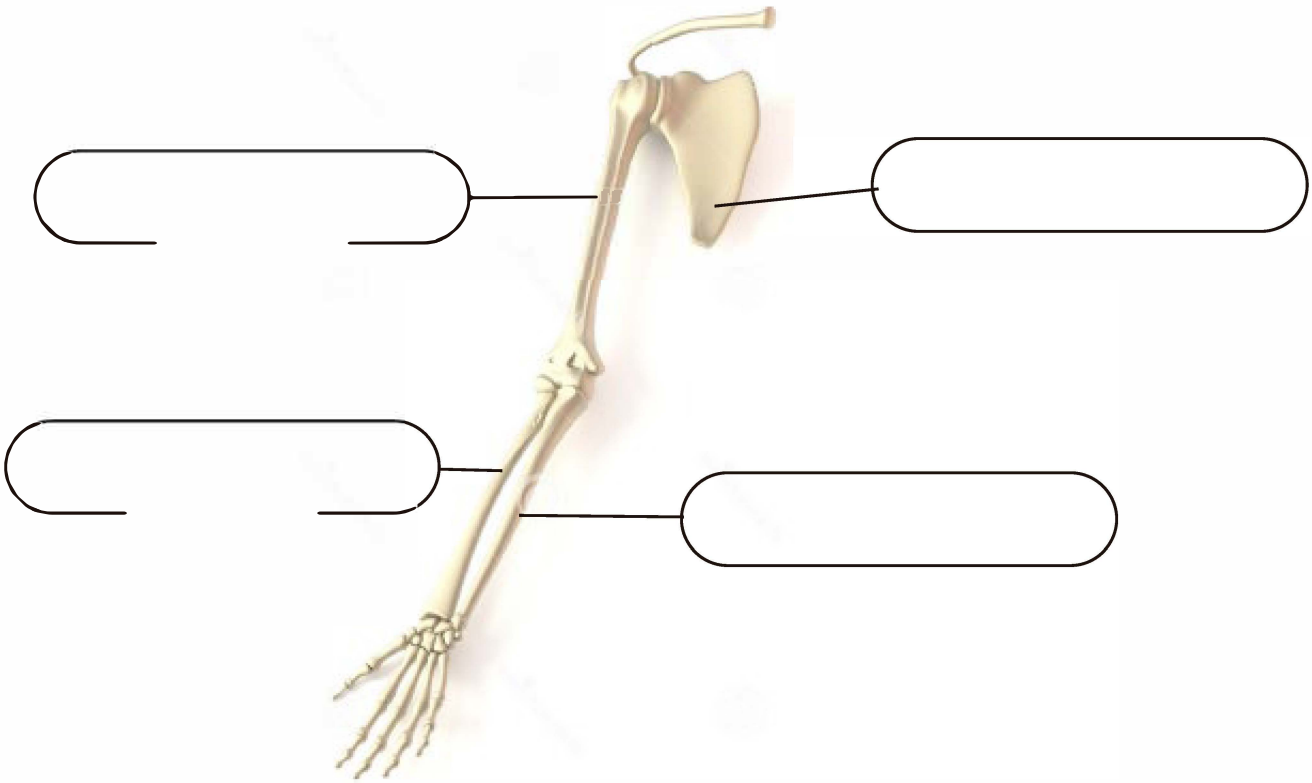
_____

_____

9. The central nervous system is composed of the brain, brainstem and spinal cord. However, cognitive functions such as thinking and solving mathematical problems occur in only one of them. **In which of the three structures mentioned above are cognitive functions performed?**

10. What is the neuron and what is the process by which it communicates with other neurons called? What is the importance of this process?

11. In the following drawing identify the bones indicated by the arrows and write their names in the corresponding boxes.



# LEARNING GOAL

Recognize and explain that living things are made up of one or more cells and that these cells are organized into tissues, organs and systems.

1. The human digestive system starts at _____. From there the food passes through the _____ and _____towards _____where digestion takes place chemistry in an acidic medium.

2. What is the alimentary bolus and which accessory glands of the digestive system participate in its formation?

_____

3. What are the functions of the teeth and tongue?

_____

4. What is the name of the functional unit of the respiratory system where gas exchange occurs?

_____

5. Discuss with your classmates the effects of cigarette smoke on the respiratory system.

_____

_____

_____

_____

_____

_____

6. Research on the following respiratory diseases: Pharyngitis, Laryngitis, Pneumonia and Bronchitis. Then indicate which structures of the respiratory system are affected by each of these pathologies.

7. Arteries are blood vessels that transport blood rich in _____ , as opposed to the veins that carry blood loaded with _____

The heart beats between 60 and 100 times per minute in an adult person. One of the ways to evaluate it is by taking the pulse by placing the index and middle fingers on an artery.

## PRACTICAL ACTIVITY (Evaluation of heart rate)

To perform this activity you should have a watch with a second hand or stopwatch at hand. Sitting comfortably in a chair, position your index and middle fingers on the side of your neck, as shown in the picture.

You should feel a throbbing sensation.

a. With the stopwatch or watch with second hand located on your other hand, count the number of beats that occur during 60 seconds.

b. When your watch completes one minute (60 seconds), you should stop the pulse count and note on this guide the number of palpitations you felt.

c. Then compare your heart rate with that of your peers.

Record your Heart Rate (HR): ..... .

*The heart rate is the number of times the heart beats during one minute.

## LEARNING OBJECTIVE

Recognize and explain that living things are made up of one or more cells and that these cells are organized into tissues, organs and systems.

**. Activity Nº 1, paired columns.**

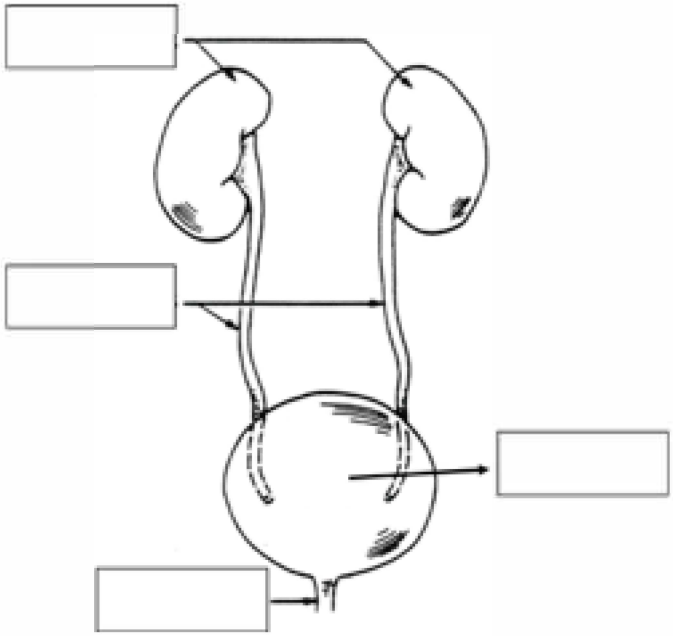
Place the letter of the column to your left in the corresponding statement of the right column..

| | |
|---|---|
| A. Kidneys | ____**B** asic filtration unit |
| **B** . Ureters | Organs responsible for eliminating waste from the body, regulating_____ _____electrolyte balance and stimulating the production of red blood cells. |
| **C** . Urethra | Highly systematized conduit that transports and allows the___ outflow to the The outermost part of the urine contained in the bladder. |
| **D** . Urina | Rather thin ducts or tubes, which carry urine from the _____ kidneys to the bladder. |
| **E** . **B** ladder | A slow yellowish, clear, watery liquid, with a characteristic odor, _____ secreted by the kidneys and eliminated to the exterior by the urinary tract. |
| **F** . Nephon | A hollow organ located in the lower abdomen and upper _____ of the pelvis to contain the urine from the kidneys. |

2. All the blood in our body (approximately 5 liters in the adult person) constantly passes through the kidneys to be filtered and eliminate metabolic wastes. Find out how long it takes for the kidneys to filter our body's blood.

3. A sex cell is one that contains half of the genetic material. There are two responsible for the process of fertilization in humans: the mature female gamete, called _____, and the mature male gamete, called _____.

Activity No. 2. Identify the structures. Write in the boxes of the drawing the name of the structure indicated by each arrow as appropriate.



4. The main function of the female and male reproductive system is the creation of a new human being. This process takes place when the sperm attaches to the secondary oocyte, a process called

_____.

5. What is the function of the uterus?

_____

_____

6. When puberty is reached, the female sex begins the process of egg maturation, menarche, one every month approximately. If the egg is not fertilized, a process of destruction and expulsion begins, which concludes with hemorrhage. The set of all these processes is called Menstrual Cycle.

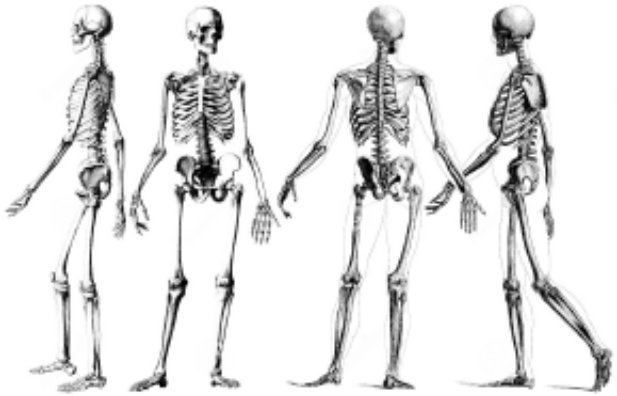
**Find out how long the menstrual cycle lasts.**

_____

_____

# LEARNING GOAL

Identify the location and explain the function of some body parts that are essential for living, such as skeleton and muscles.



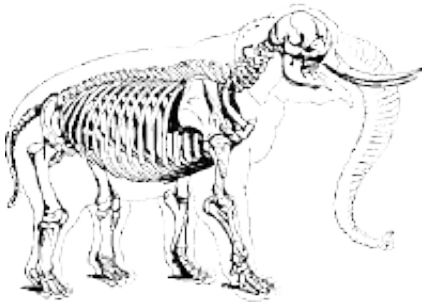
**THE SKELETON**

The skeleton is a set of bones that supports our body and protects some organs.

The skeleton gives shape to our body and allows us to walk, run, jump, climb and others.

The body has 206-208 bones approximately and each of them has its name. Some bones of our body are: Skull, spine, jaw, ribs, clavicle, sternum, humerus, femur.

The spine is made up of 20 vertebrae and is located in the back, thanks to it, we can bend our body forward, backward and sideways.



ELEPHANT

TURTLE

FROG

In nature we find many animals that have a backbone: the dog, the cow, the duck, the fish, etc.

CRANIUM

It is the bone that protects the brain

Did you know that the largest bone is the femur which is located in the leg? The smallest bones are located in the ear and are: The anvil, the malleus, and the stapes.

RIBS

They are the bones that protect the heart and lungs.

SPINAL COLUMN

Allows us to keep our body upright

Answer and comment with your teacher and classmates:

1.- What is the importance of having bones in our body?

2.- Do all animals have skeletons? Investigate.

3.- In your opinion, what is the most important bone in your body? Why?

# LEARNING GOAL

Recognize and explain that living things are made up of one or more cells and that these cells are organized into tissues, organs and systems.

## LOCOMOTOR SYSTEM

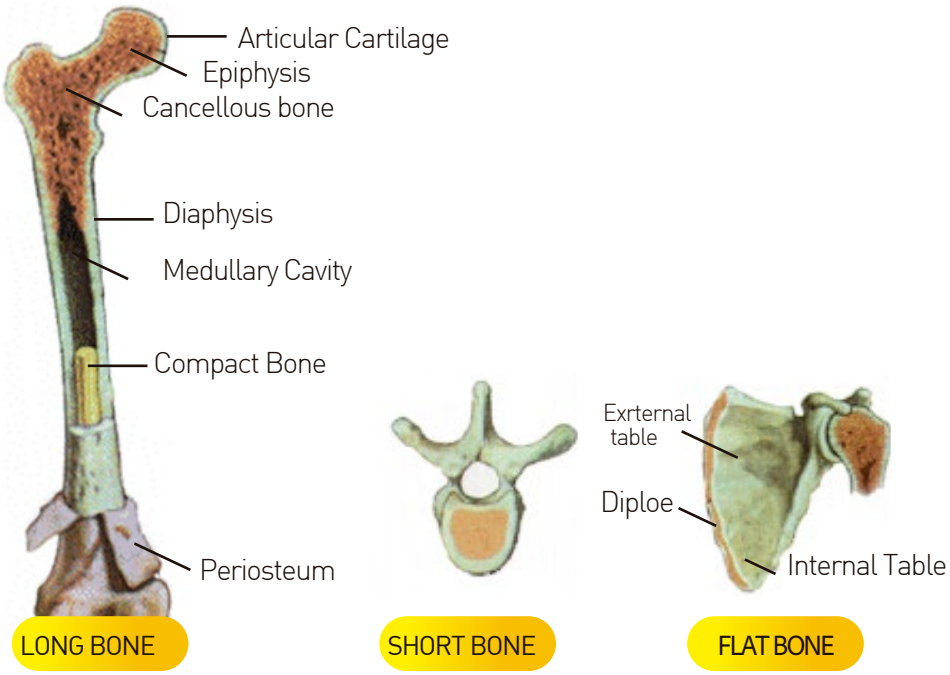
The locomotor system is the set of structures that allow our body to perform any type of movement. The locomotor system is formed by the skeleton or osseous system (bones) and the muscular system (muscles).

## THE SKELETAL SYSTEM

The skeleton or skeletal system is made up of bones, cartilage and joints.

Bones are hard and resistant organs that form the skeleton. The bones have the following functions: they give shape to the body, protect some vital organs and allow movement thanks to the muscles that are attached to them through tendons.

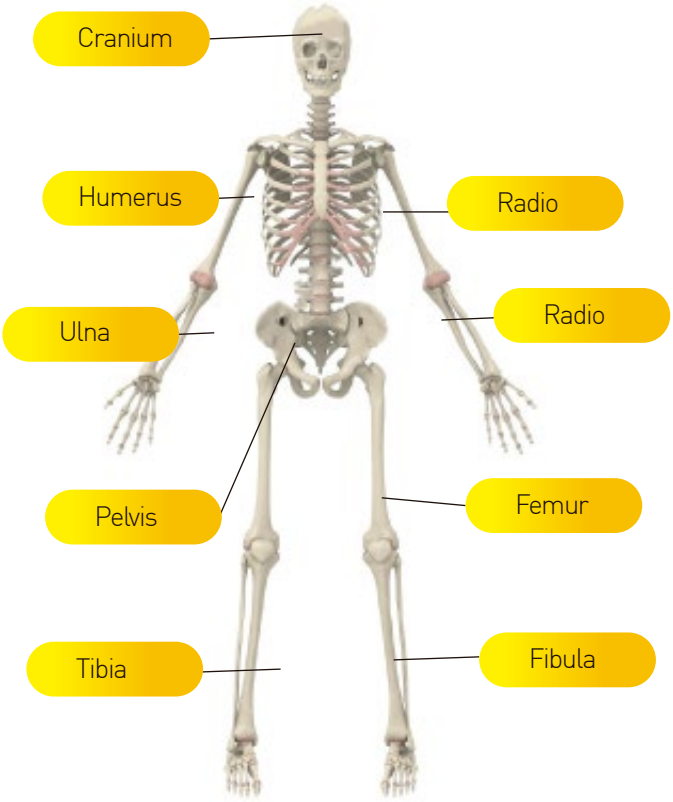
Bones according to their shape




According to their shape, bones can be of three types: long bones - short bones - flat bones.

- **Long bones:** they have an elongated shape. Their middle part is called diaphysis and their ends epiphysis. They act as levers for movement (e.g. femur, tibia, etc.).
- **Short bones:** they are more or less cubic (e.g. vertebrae, wrist bones, etc.).
- **Flat bones:** they have a flattened shape. They act as organ protectors or for the insertion of muscles (e.g., skull bones).

The skeleton of an adult human consists of 206-208 bones. Some of the bones of the human body that you should know are those shown in the following figure:




The bones are joined together by structures called joints.

It must be taken into account that bones are not immobile structures, they move in relation to each other. The joints make possible the movement of the bones. Depending on the degree of movement they allow, there are three types of joints:

mobile joints - semi-mobile joints - fixed joints.

The mobile joints are those that allow a wide movement of the bones.

(e.g. knee, elbow, hip and shoulder joints).

Semi-mobile joints are those that allow little movement of the bones (e.g., the joints that exist between the vertebrae that form the spinal column).

Fixed joints are those that do not allow movement of the bones (e.g., the joints of the bones of the skull) and their function is usually to protect the internal organs they surround.

**THANKS TO THE JOINTS WE CAN MOVE AND OUR ORGANS ARE PROTECTED.**

**LIGAMENTS AND CARTILAGE**

Ligaments are very resistant strips of tissue that join the bones in mobile and semi-mobile joints. For example, the humerus is joined by a ligament to the radius and by another ligament to the ulna.

ligament to the ulna.

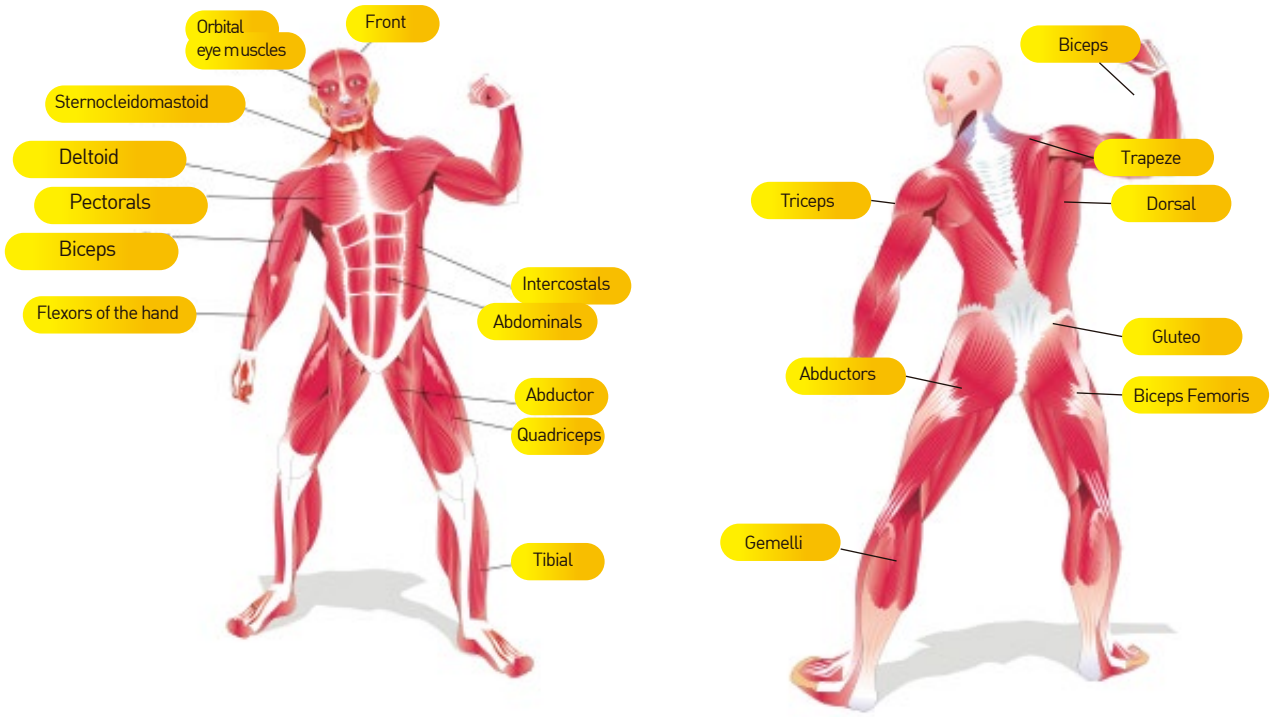
Cartilages are softer and more elastic than bones. We can find cartilages in the joints (facilitating the movement of bones), in the ears, in the nose, in the trachea, etc.

## MUSCULAR SYSTEM

- Muscles are elastic organs, i.e. they contract and relax without breaking.
- Muscles are made up of elongated muscle cells called muscle fibers.
- When muscles contract, they shorten and produce the movement of some part of the body.

The main function of muscles is to move the different parts of the body by supporting the bones. To do this, the muscles are attached to the bones through a set of fibers called tendons. For example, the biceps tendon attaches the muscle to the radius, and the triceps tendon attaches the muscle to the ulna.

The most important muscles of the body are those shown in the following figures:




According to their **shape**, muscles can be of three types: f**usiform muscles - orbicularis muscles - flattened muscles.**

- Fusiform muscles have an elongated shape. Most of the muscles of the extremities are fusiform muscles (e.g. biceps, quadriceps, abductors).
- Orbicularis muscles are ring-shaped and are found surrounding body orifices.

(Ex: orbicularis oris muscles of the mouth).

- The flattened muscles are flat in shape (e.g., frontalis, pectoralis, abdominals).

According to the **movement they perform**, muscles can be of two types: **voluntary muscles - involuntary muscles.**

- Voluntary or skeletal muscles are those that contract voluntarily, i.e. consciously. They are the muscles that are part of the locomotor apparatus (e.g. biceps, triceps, dorsalis). They are attached to the bones by tendons, a non-contractile part of the muscle, but very firm and resistant.

• Involuntary muscles are those muscles that contract involuntarily, i.e., they are contract without our being aware of it. These muscles are present in the internal organs of our body (stomach, intestine, blood vessels, heart, etc). Without them, you would have to tell your heart when to beat and your stomach when you grind your food.

ANALYZE As you can see, to achieve movement, both the skeletal and muscular systems work together, but how do they coordinate?

RESEARCH AND ANSWER (keywords: brain-nerve)