

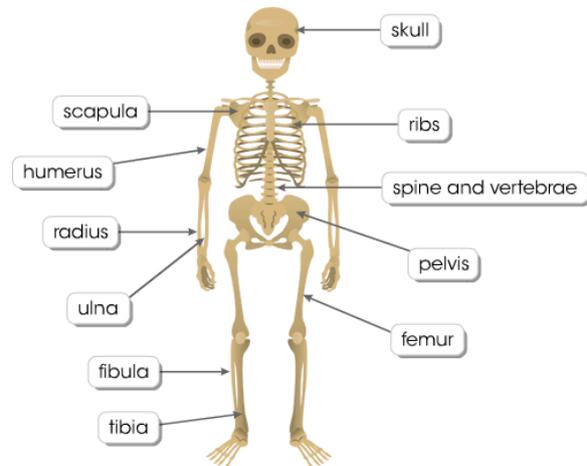
The locomotor system

Bones and muscles give our bodies shape and support. They help us to move and they protect our internal organs.

The skeleton

The human skeleton has 206 bones. They are very strong.

- The **skull** protects the brain
- The **spine** protects the spinal cord and supports the body. It has 26 small bones called **vertebrae**.
- The **ribs** protect the heart, lungs and liver.
- The **scapula** connects the arms to the skeleton. The **humerus** is in the upper arm. The **radius** and **ulna** are in the lower arm. These bones move when we move our arms.
- The **pelvis** also connects the legs to the skeleton. The **femur** is in the upper leg. The **tibia** and **fibula** are in the lower leg. These bones move when we move our legs.



The joints

A joint is where two bones meet. They are connected by strong elastic tissue called **ligaments**. The ends of the bones at the joints are covered in strong flexible tissue called **cartilage**. They can be **movable** or **fixed**.

If we did not have joints we would find simple tasks like eating very difficult. Any movement needing bending would be impossible!

Fixed joints, don't move at all. Example: skull.

We actually have three main types of movable joints:

- **Semi-moveable** or **gliding joints**, move a little. Example: spine.
- **Ball and socket joints**, move in almost any direction. Example: hip, shoulder.
- **Hinge joints**, move in one direction. Example: elbow, knee, finger.



skull
(fixed)



spine
(semi-moveable)



hip
(ball and socket)



elbow
(hinge)

The muscles

There are more than 650 muscles in the human body. They have many different uses. There are two main groups of muscles:

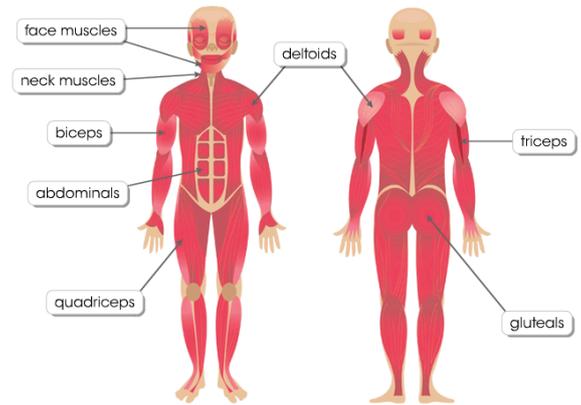
- **Voluntary muscles** are muscles we can control. These are **skeletal muscles**.
- **Involuntary muscles** are muscles we can't control. These are **smooth muscles** and **cardiac muscle**.

Voluntary muscles

Skeletal muscles move our bones. They can contract only for a short time.

You use your:

1. **face muscles** to smile and make other expressions.
2. **neck muscles** to hold your head and turn it.
3. **deltoids** to move your shoulders.
4. **biceps and triceps** to move your arms.
5. **abdominals** to hold your stomach in.
6. **quadriceps** in your legs when you run.
7. **gluteals** when you sit down.

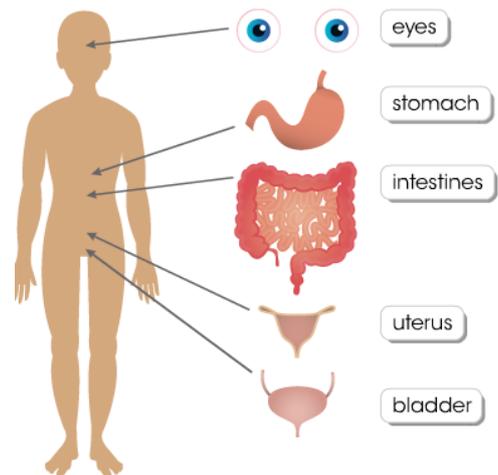


Involuntary muscles

Smooth muscles are in the walls of the stomach, intestines and other organs. They can contract for a long time.

There are smooth muscles in...

1. your **eyes**, they help to focus your pupils.
2. your **stomach** and **intestines**, they move food through your body.
3. your **bladder**, they hold urine in.
4. the **uterus**, they push the baby out when it is born.



Cardiac muscle is in the heart. It pumps blood around the circulatory system. It can contract and relax without stopping.

How do muscles move our bones?

1. The skeletal muscles work in pairs. For example, the **biceps and triceps** work together to move the arm.
2. **Tendons** join our muscles to the bone. For example, they attach the biceps and triceps to the arm and shoulder bones.
3. Muscles can contract and relax. When a muscle contracts it gets shorter and pulls the bone towards it. For example, your arm bends when **the biceps contracts**. It pulls the lower arm towards the shoulder.
4. Muscles can only pull. They can't push. The biceps can't straighten your arm. Your arm straightens when the **triceps contracts**. It pulls the lower arm away from the shoulder.



Be active

We need to look after our bones, muscles and nervous system, specially while we are growing.

- Always warm up before you exercise (cold muscles are easier to damage)
- Do some physical exercise every day (to keep muscles and bones strong and healthy)
- Wear a helmet and safety pads when cycling or skateboarding (protect brain and joints)
- Eat a healthy diet with lots of different food groups (bone, muscles and brain need minerals, vitamins, carbohydrates, protein and fat to grow and work well)
- Drink a lot of water when you are thirsty (body and brain need water to work well)
- Exercise your brain every day (it needs training to work well)

