CEU Colegio San Pablo | Sevilla

SIXTH OF PRIMARY

NATURAL SCIENCE

LS1: HOW DO WE INTERACT WITH THE WORLD

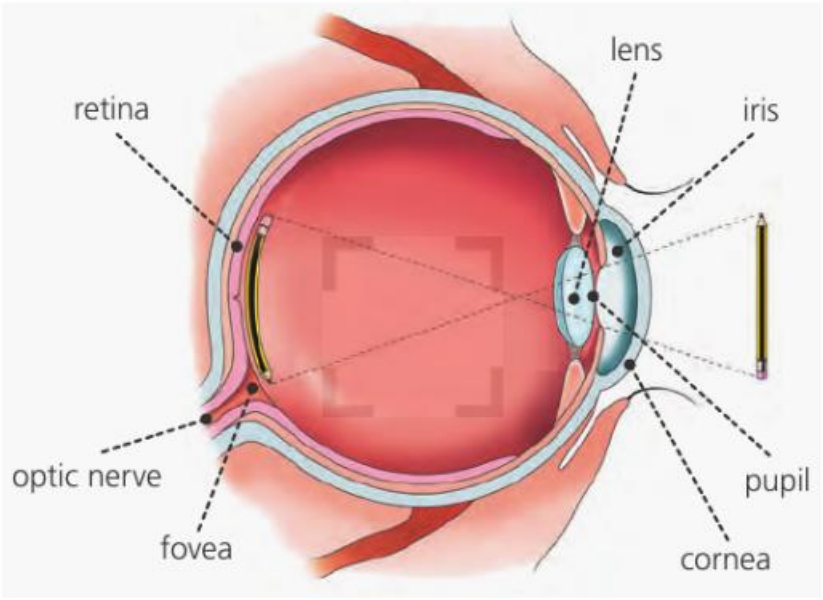
THE SENSES

Our sense organs let us interact with the world around us. These organs contain nerve receptors, which are specialized cells that collect information (stimuli) that send to the brain.

SIGHT

The **eyes** are the sense organs, and the stimulus is the light.

1. Light passes through the **cornea** (the surface that covers the eye) and enters the eye through the **pupil**.
2. The coloured part (the **iris**) controls the amount of light that enter, opening or closing the pupil.
3. The **lens** focuses the light on the retina, which is the inner part of the eye.
4. Nerve receptors are in the **retina** and send electrical signals to the optic nerve.
5. The **fovea** is a membrane that connects the retina with the optic nerves.
6. The **optic nerve** sends the information to the brain.

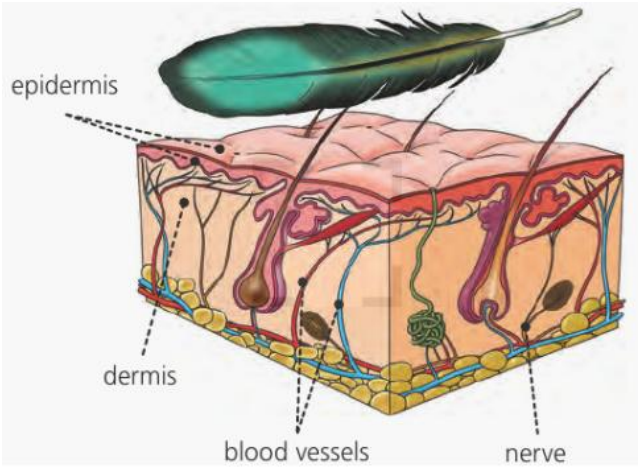


TOUCH

The **skin** is the sense organ, and the stimulus can be the pressure, texture, heat or pain.

The top layer (the surface) is called **epidermis** and the inner part is the **dermis**.

In the dermis, there are **blood vessels** and **nerve receptors**. These nerves that detect heat, pressure and texture send the electrical signals to the brain.

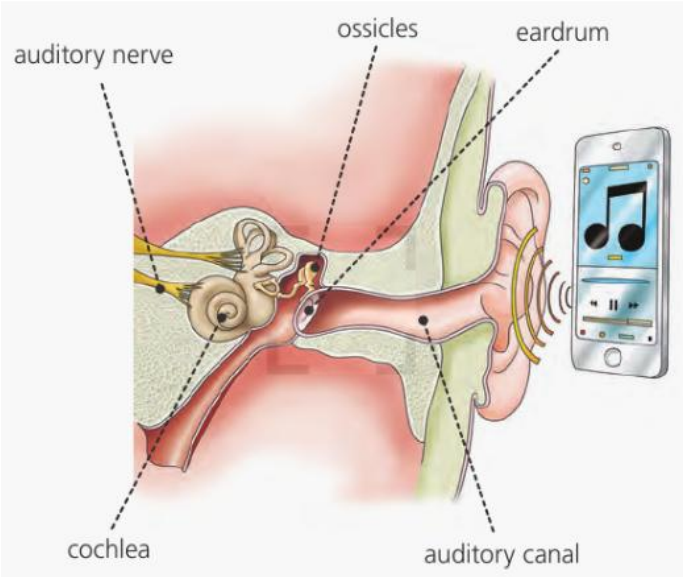


HEARING

The **ears** are the sense organs, and the stimuli are the sound waves.

The ear is divided into 3 parts: outer ear, middle ear and inner ear.

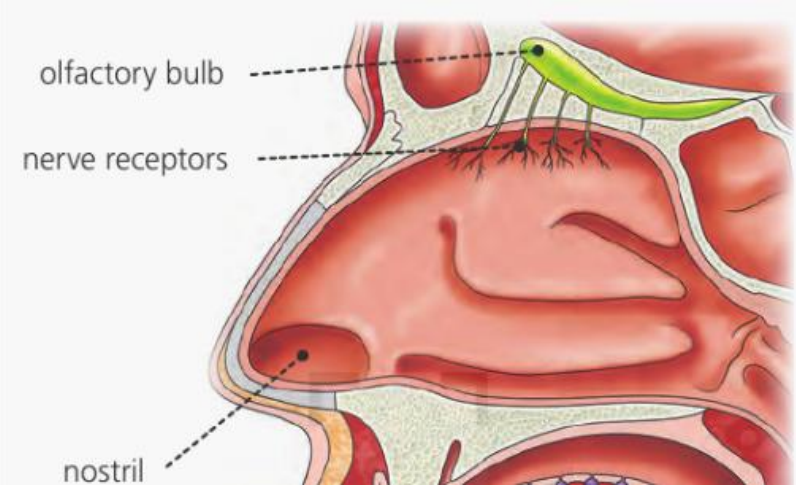
1. **Sound waves** enter through the **auditory canal** and make the eardrum vibrate.
2. When the **eardrum** vibrates, the **ossicles** (3 small bones connected) vibrate.
3. The **cochlea** detects sound vibrations and transforms them into electrical signals.
4. The **auditory nerve** sends these signals to the brain.



SMELL

The **nose** is the sense organ, and the stimuli are the chemicals in the air.

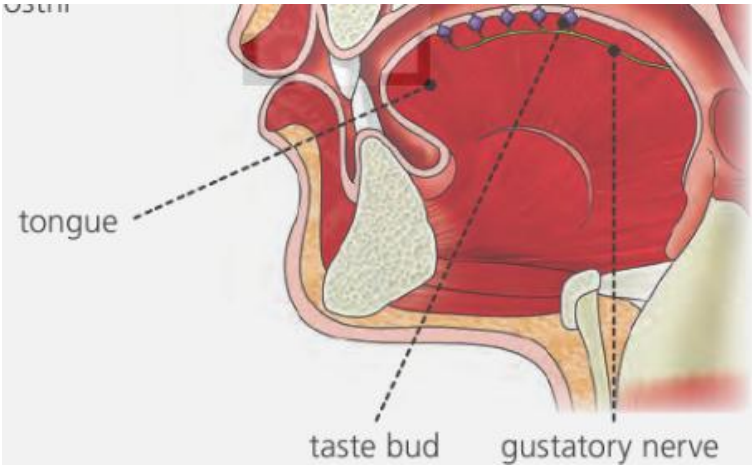
1. The air enters the nose through the **nostrils**.
2. The particles are detected by the **olfactory nerves**.
3. The nerve receptors send the information to the **olfactory bulb** in the brain.



TASTE

The **tongue** is the sense organ, and the stimuli are the chemicals in food.

1. Food touches the tongue, which has got **taste buds** on it.
2. The taste buds detect the different tastes: **umami, salty, sour, bitter or sweet.**
3. The **gustatory nerve** (inside the tongue) sends the signals to the brain.



THE NERVOUS SYSTEM

Our nervous system is our body´s control centre. The brain controls the body, receives and sends the information to other organs and parts of the body through neurons to tell them what to do.

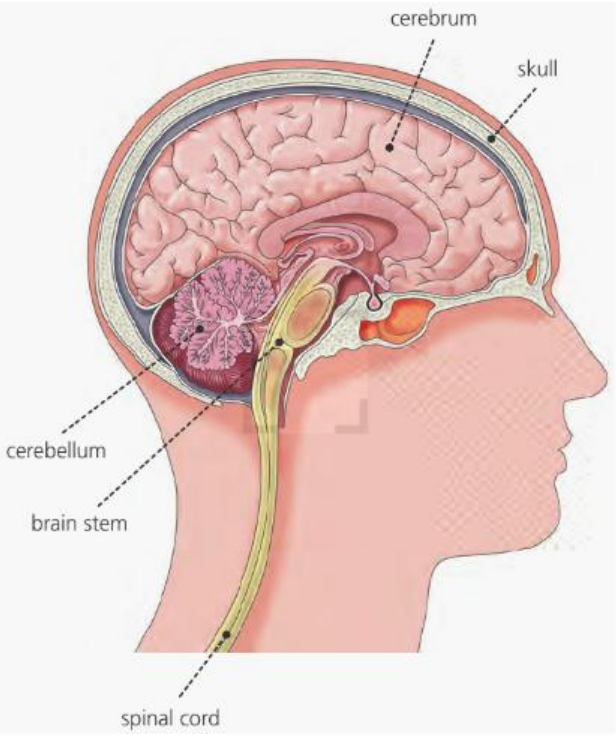
The nervous system is divided into 2 parts: the central nervous system and the peripheral nervous system.

THE CENTRAL NERVOUS SYSTEM

It is formed by the brain and the spinal cord.

➢ THE BRAIN

It is protected by the skull and controls the body. It decodes the information from nerves and coordinates a response. The brain is divided into 3 parts:



- The **cerebrum**: It controls **voluntary actions**. It **processes information** and **thinking** (memory, thoughts, feelings) and take decisions.

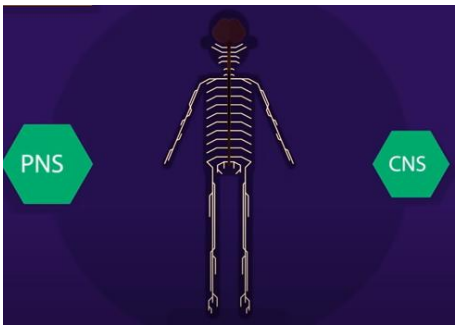
- The **cerebellum**: It controls **movement**, **balance and coordination.**

- The **brain stem**: It connects the brain to the spinal cord and controls **involuntary actions** (sleeping, breathing, heartbeat, digesting…).

➢ THE SPINAL CORD

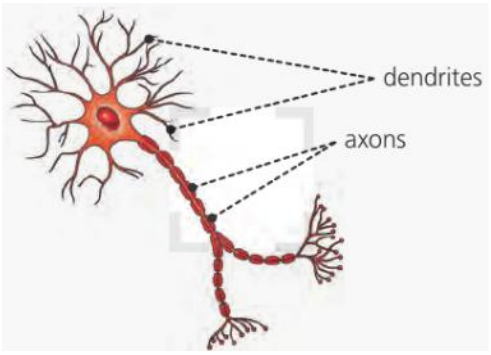
It is a nerve tissue protected by bones, called vertebrae. The spinal cord connects the nerves to our brain and also controls **reflex actions**.

THE PERIPHERAL NERVOUS SYSTEM



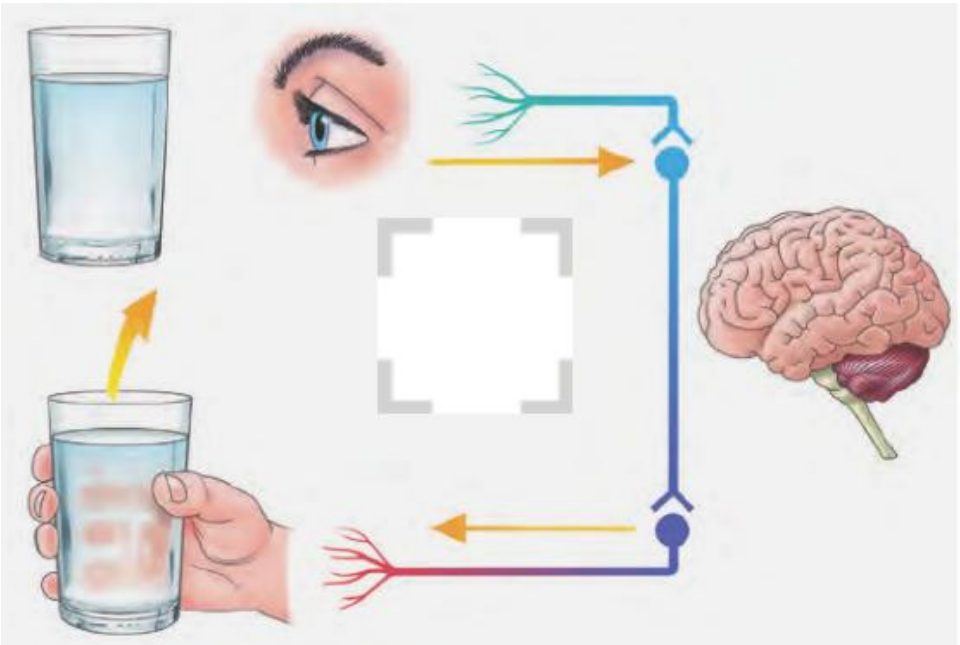
It is made up of **nerves**. They are formed by tiny cells called **neurons** that transmit electrical signals.

Neurons have **dendrites** that are the receptors from our sense organs that transform a stimulus into an electrical signal, called an impulse. The impulses are sent along the **axons** to the brain, so the neurons are connected by their axons.



There are 3 types of neurons:

- **Sensory neurons**: they send the information from the sense organs to the spinal cord and brain.
- **Interneurons**: they carry signals (information) between the different parts of the central nervous system.
- **Motor neurons**: they send the answer from the brain to the sense organs.



SENSORY NEURONS

INTERNEURONS

MOTOR NEURONS

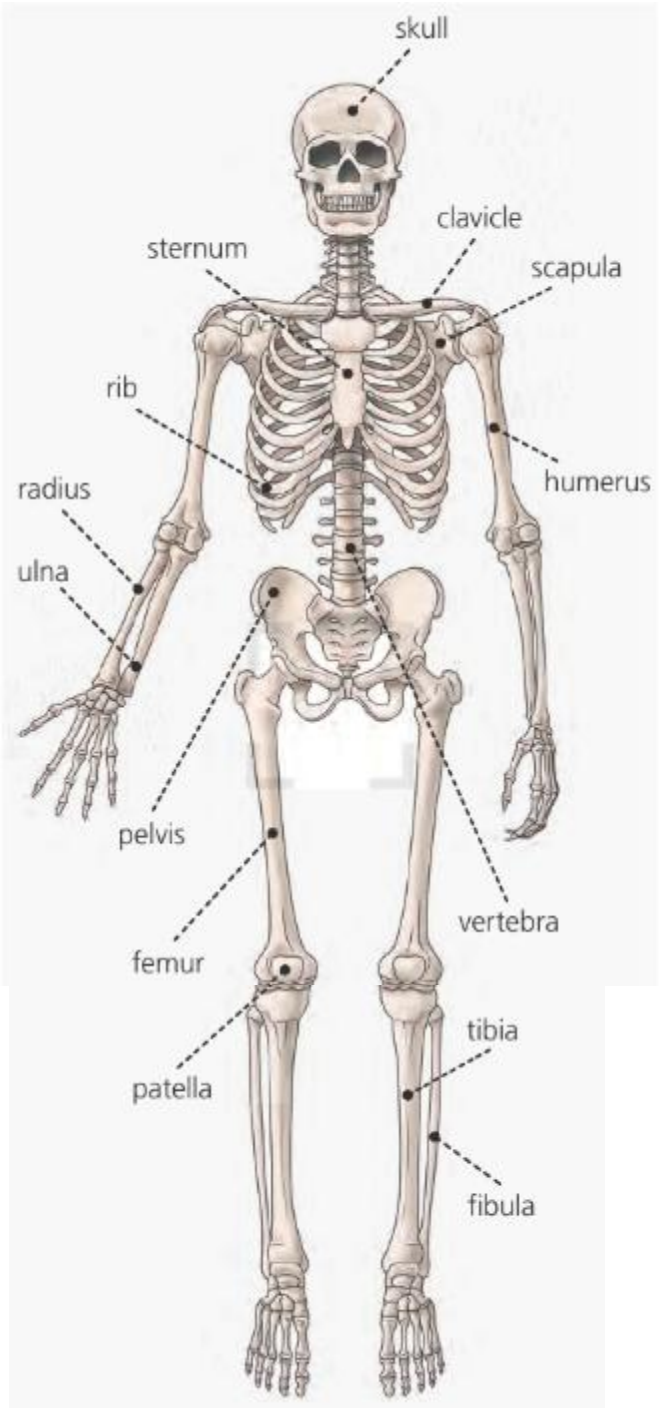
THE MUSCULOSKELETAL SYSTEM

Our body responds to signals that come from the brain. The signals travel through the nervous system to our muscles, which contract and relax. The muscles move our bones and joints.

THE SKELETON

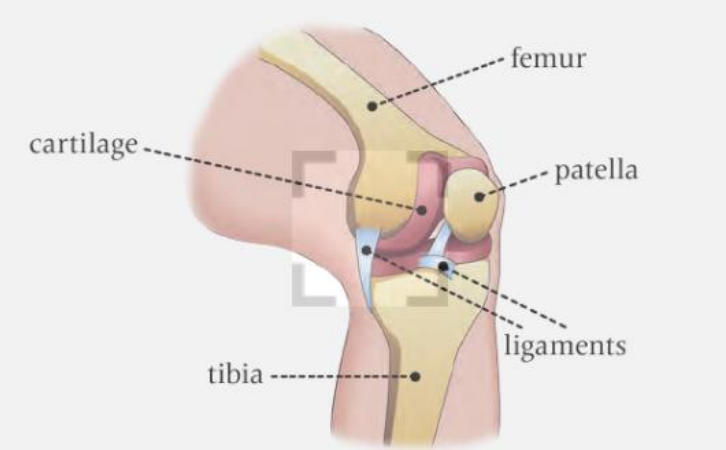
- **BONES / SKELETON**

Our skeleton supports our body and protects our inner organs.



➢ JOINTS

Our bones are connected by joints. Our joints are held together by tissues called **ligaments**. The ends of our bones are protected by other tissues called **cartilages**.



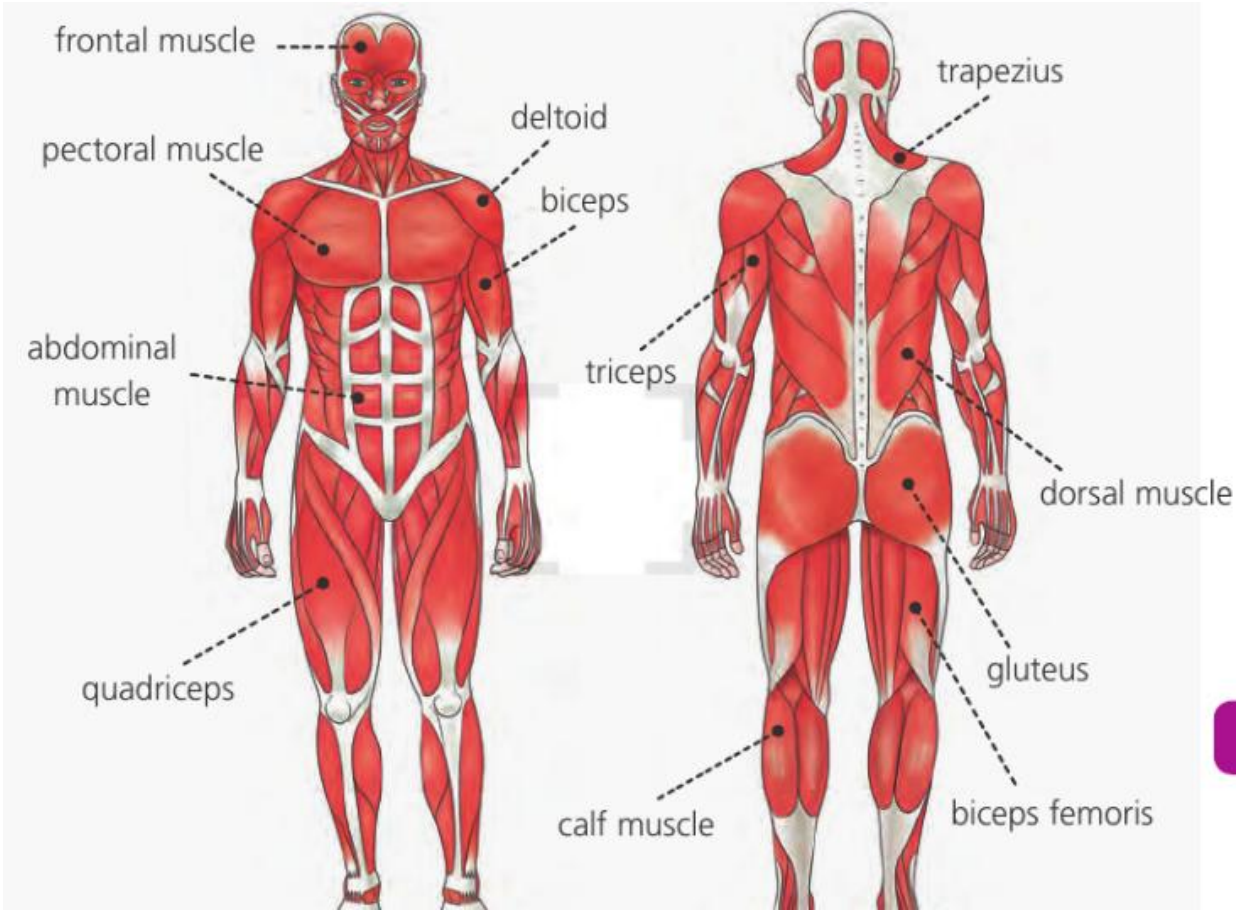
Types:

- **Fixed joints**. (example: skull)
- **Semi-flexible joints**. (example: vertebrae/spine)
- **Flexible joints**. (example: elbows and knees)

MUSCLES

A muscle can contract (get shorter) or relax (get longer). There are 3 types:

- **Skeletal muscles**: they are joined to bones by tendons.
- **Smooth muscles**: they are involuntary muscles that are found in organs.
- **Cardiac muscles**: they are involuntary and let the heart move and beat.



ACTIONS

Most of the actions involving our musculoskeletal system are **voluntary**, but there are other **involuntary** actions carried out by smooth and cardiac muscles (like breathing or heartbeat).

Sometimes a very quick response to a stimulus is needed. This is called a **reflex,** and it happens without us having to think. In reflexes, a sensory neuron carries a message from a receptor to the spinal cord. From there, a motor neuron carries the response back to an effector. So, the brain is not involved. This process is called **reflex arc**.