

Power point Example

NEUROHEADWAY

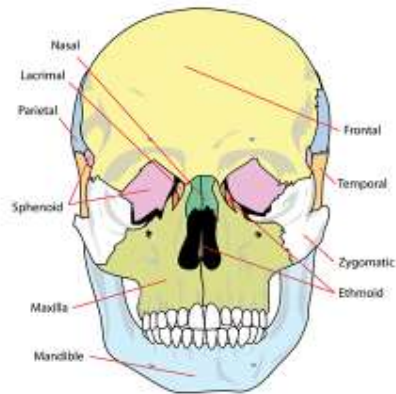
Neuroscience Into Education

The spin and the spinal cord

The Skull / Spinal Cord / Spinal Reflex / Getting your Muscles Moving /
The Brain and it's Structures

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The skull



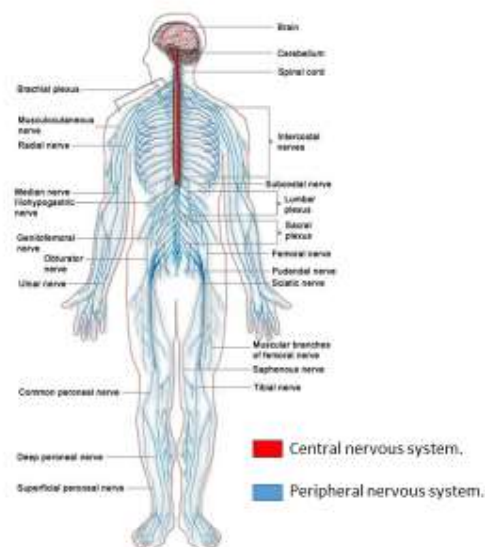
The skull, also known as **cranium**, is the "bone-case" of the head.

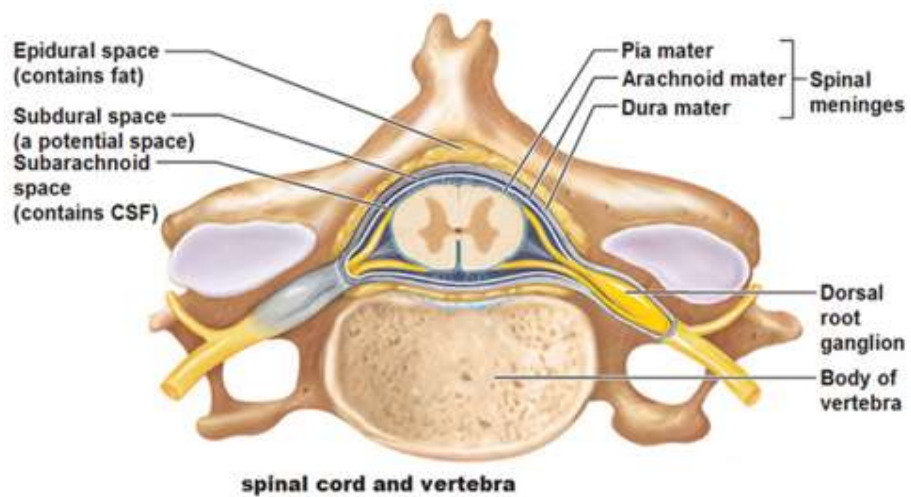
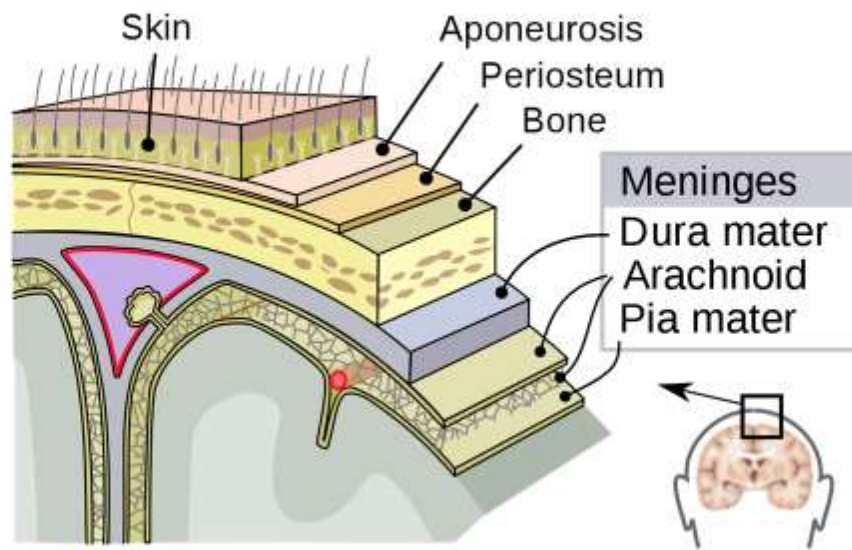
It is protecting the brain (encephalon) as well as other organs and systems like our visual system (eye balls, eye nerves) or our olfactory system (nose, pituitary...).

It is the entrance of the digestive system (mouth), respiratory system (nose) or auditory system (ears).

The spinal cord

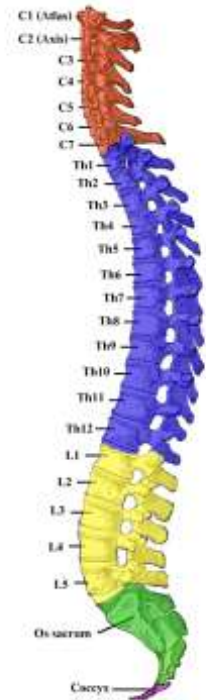
- The central nervous system (CNS) is formed by the brain (and cerebellum) and the spinal cord.
- The Spinal Cord is the main bridge of communication between brain and body.





Structure of the spinal cord

- The vertebral column is formed by discs, sections or **segments**.
- The human body has **31 spinal segments**. They are named after the area where they are located. Likewise, we have 8 **cervical** segments (the neck and back-head), 12 **thoracic** segments (upper part of the back), 5 **lumbar** segments (lower back), and 5 **sacral** segments (our bum) + 1 **caudal**; also called coccyx (the tail of other animals).



Movement

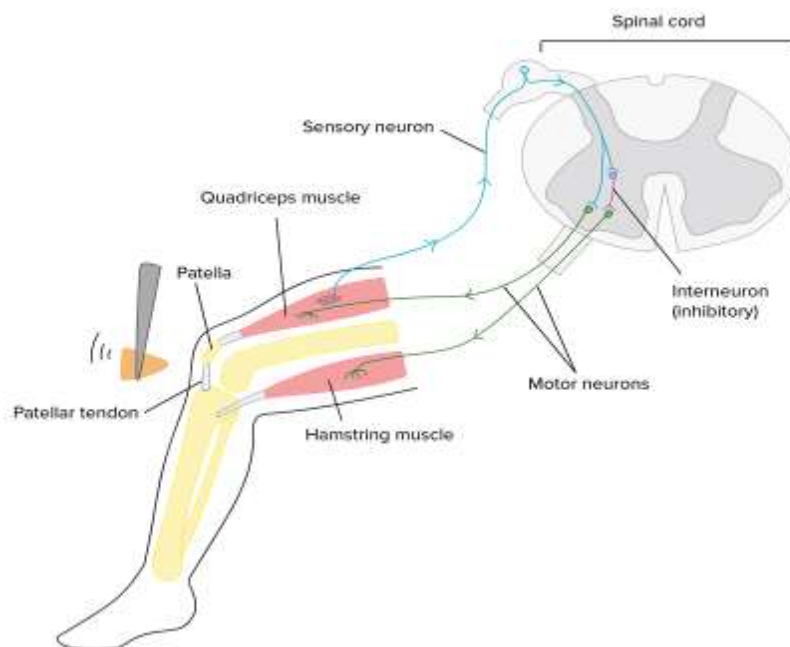
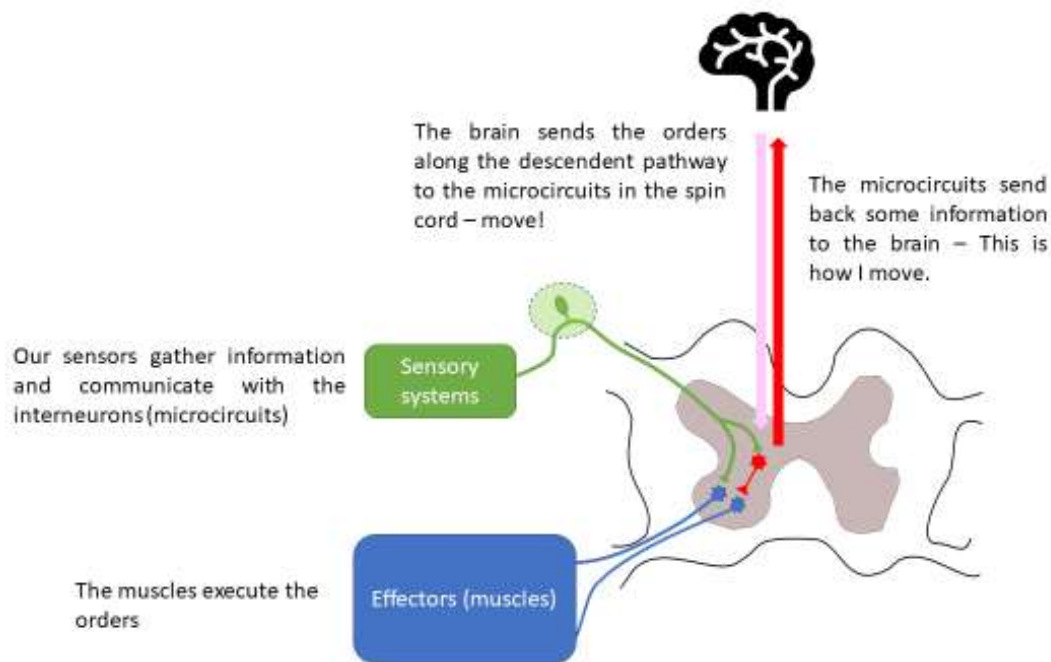
- We can differentiate two types of movements: **voluntary movements** (those we plan and decide consciously) and **involuntary movements** (those whose planning and execution happen unconsciously)



When we pour water in a glass, there are two kind of movements. First, we voluntarily fill the glass of water; so we grab the bottle, hold the glass, and move the bottle so the water starts to flow to the glass. This is voluntary.

However, we are unconsciously doing other movements. The hand and arm holding the glass is constantly readapting the tension and relaxation of the muscles to adapt to the changing weight of the glass (the amount of water is increasing). Also, the hand and arm holding the water is readapting the posture all the time so the water does not pour all over the glass, but also it does not stop flowing. This is involuntary.

All these movements are controlled by complex mechanisms in the brain and the spinal cord.



The hit of the hammer activates the sensory receptors in the quadriceps. These send the information through the sensory neuron to the spinal cord. There, the sensory neuron does two things:

- Activates the motor neuron. This motor neuron will contract the quadriceps (the muscle will get shorter)
- Activates an inhibitory interneuron (they are like switch of triggers). This interneuron will inhibit or block the contraction of the antagonist muscle of the quadriceps (the hamstring muscle). If the hamstring muscle contracted too, the leg could not move (both muscles are trying to contract at the same time). By blocking the antagonist motor neuron, the movement is now possible (raise the foot).