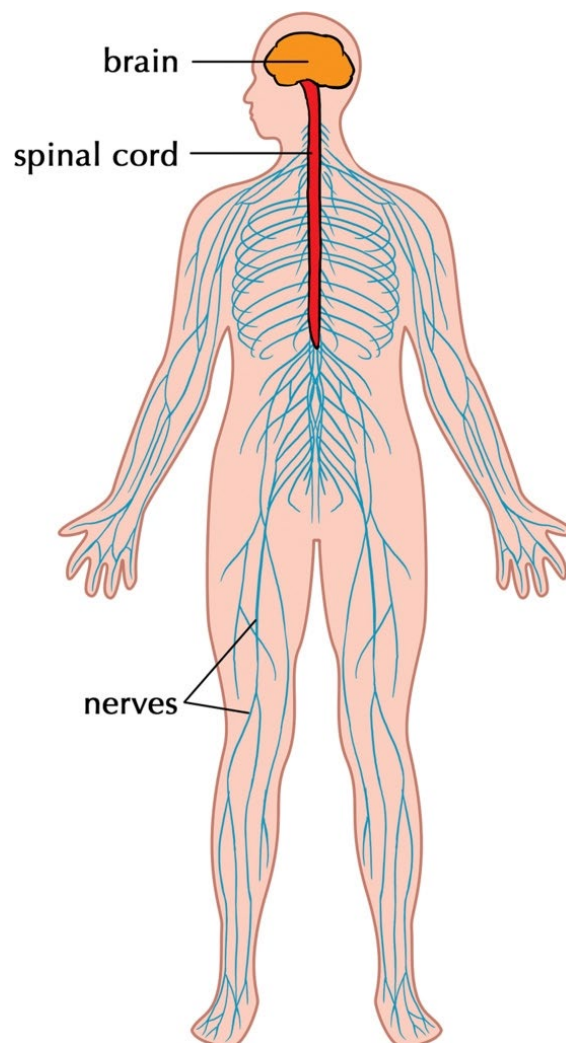


The Nervous System – Part 1

Introduction

The **nervous system** is the control system of the body. It controls our thoughts and feelings and controls a majority of our body functions. This system is like a massive, complex computer. Even today, we still don't know much about the brain! Did you know that neuroscience is the study of the nervous system, which includes the brain? Scientists in this field admit that we still know very little about the brain. How exciting it is that there is still so much to discover about the human body?

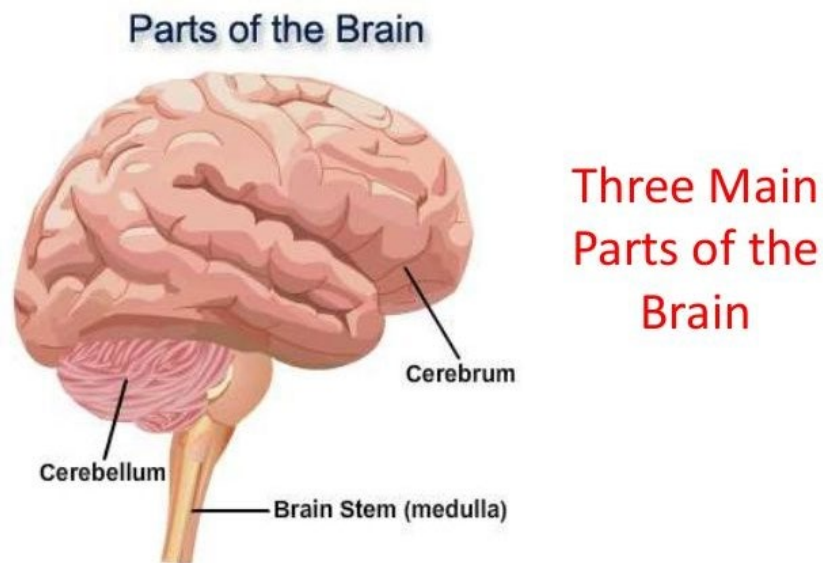
The nervous system is made up of the **brain**, the **spinal cord**, and a large network of **nerves** that covers all parts of the body. Together, the nervous system helps different parts of our body to communicate and allows our brain to control what is going on.



The Brain

Your brain is the star of the show! This grey, spongy **organ** found within your skull is essentially the boss of your body and is able to work at lightning speed. Did you know that when you learn something new, your brain actually grows? It's true! New pathways in your brain form every time you learn something new. When you practice, the connections in the new brain pathway grow stronger, changing your brain!

The brain is where we do our thinking. All our **senses** are tied into our brain allowing us to experience the outside world. We remember, have emotions, solve problems, worry about stuff, feel pain, dream about the future, and control our bodies in our brain. There are many different parts of the brain, but for now, you will learn about 3 main parts: The **cerebrum**, the **cerebellum**, and the **brainstem**.



Fun Fact: Did you know that your brain is about the size of two of your fists put together and weighs (on average) 3.3 lbs?



Check out this video to see what a real human brain looks like! <https://youtu.be/4Dcj6nYcbLI>

The Senses

Sight. Sight probably tells us more about the world than any other sense. Light entering the [eye](#) forms an upside-down image on the retina. The retina transforms the light into nerve signals for the brain. The brain then turns the image right-side-up and tells us what we are seeing.

Hearing. Every sound we hear is the result of sound waves entering our ears and making our eardrums vibrate. These vibrations then move along the tiny bones of the middle ear and turned into nerve signals. The brain processes these signals, telling us what we're hearing. More on hearing:

<https://kidshealth.org/en/parents/ears.html>

Taste. The tongue contains small groups of sensory cells called taste buds that react to chemicals in foods. Taste buds react to sweet, sour, salty, bitter, and savory. The taste buds send messages to the areas in the brain that are responsible for processing taste.

Smell. Olfactory cells in the mucous membranes lining each nostril react to chemicals we breathe in and send messages along specific nerves to the brain.

Touch. The skin contains millions of sensory receptors that gather information related to touch, pressure, temperature, and pain and send it to the brain for processing and reaction. More on touch:

<https://kidshealth.org/en/parents/skin-hair-nails.html>



The Cerebrum

The cerebrum is the **largest part** of your brain and it's actually the most advanced part too. This section of your brain controls a lot!

The cerebrum uses information from our senses to help us **understand** what is happening around us. Then it tells our body **how to respond**. For example, if you saw a threat, such as a grizzly bear, your cerebrum would take this sensory information (seeing the bear) and react by getting away from the danger.



The cerebrum also controls our emotions, our ability to talk, think, read, remember and learn; among many, many other things! That's a lot of jobs hey? Well, these jobs are split up into **two sides of the cerebrum**; one of which controls critical thinking tasks and the other handles more creative thinking tasks. Let's check out the two parts, or "hemispheres" of the cerebrum in greater detail:

- The **left hemisphere**, or "left brain" plays an important role in language, verbal memory, reading, writing, facts, and mathematics. This is the side of the brain that is in control of **critical thinking**. It controls the muscles on the **right side** of the body.
- The **right hemisphere** or "right-brain", plays a large part in interpreting our sense, non-verbal communication, emotions and recognizing faces. This is the side of the brain that is in control of **creative thinking**. It controls the muscles on the **left side** of the body.

LEFT BRAIN:

CONTROLS THE RIGHT
SIDE OF THE BODY

WRITING

MATH

LOGICAL
THINKING



RIGHT BRAIN:

CONTROLS THE LEFT
SIDE OF THE BODY

ARTISTIC

CREATIVE

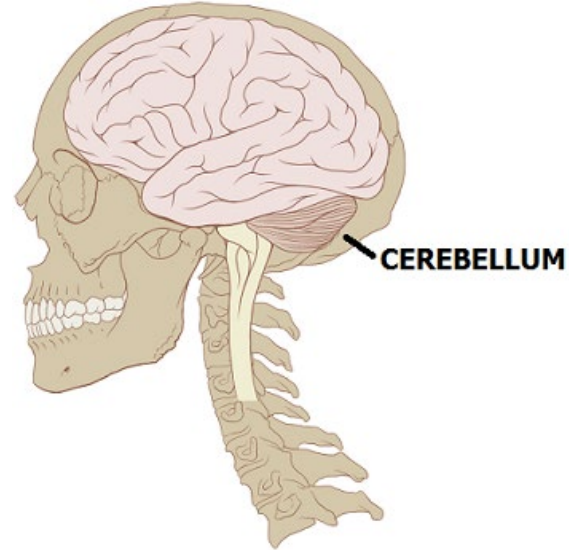
ART AND MUSIC
AWARENESS



The Cerebellum

Snowboarding, juggling, walking, playing soccer – you couldn't do any of it without this small but powerful part of the brain. The **cerebellum** is at the back of the brain, below the cerebrum. It's a lot smaller than the cerebrum, but it's still a very important part of the brain. It controls **balance, movement,** and **coordination** (how your muscles work together).

The cerebellum can learn **motor movements** with practice allowing us to do stuff like riding a bike, walking or typing without even thinking about how to it. Do you have to consciously tell yourself "Okay, lift my right leg up, bend my knee, bring it forward, place the ball of my foot down and then my toes" every time you take a step? No! Certain motor movements become **natural** the more you use them.

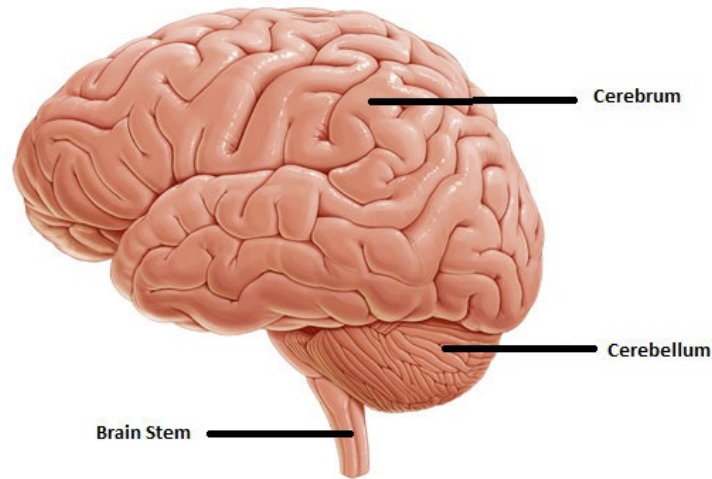


Fun Fact: The cerebellum has more neurons than any other part of your brain!



The Brain Stem

The **brain stem** sits beneath the cerebrum and in front of the cerebellum. It **connects the rest of the brain to the spinal cord**, and is basically the **secretary** of the brain- it sorts through millions of messages that the brain and the body send back and forth!



The brain stem controls the flow of messages between **the brain** and the rest of the body, and it is also in charge of all the functions your body needs to stay alive, like breathing air, digesting food, and circulating blood.

Part of the brain stem's job is to control your **involuntary muscles** — the ones that work automatically, without you even thinking about it. There are involuntary muscles in the heart and stomach, and it's the brain stem that tells your heart to pump more blood when you're biking or your stomach to start digesting your lunch.



Complete the following:

The Nervous System True or False: If a statement is false, change it so that it is true.

1) Your brain is a muscle.

2) When you learn something new, your brain forms new pathways.

Video: Science for Kids – Body Parts – THE BRAIN

Watch the video “Science for Kids – Body Parts – THE BRAIN” to answer the following questions:

1) How many calculations can the average human brain perform in 1 second?

2) What percentage of the brain is made up of water? _____

3) Does your brain control your body even when you sleep? _____

4) Where are new memories stored? _____

What is the largest and most advanced part of the brain?

In your own words, list some of the functions of the cerebrum.

Compare the right hemisphere to the left hemisphere.

Left Hemisphere	Right Hemisphere
<ul style="list-style-type: none">• Ex. Critical Thinking	<ul style="list-style-type: none">• Ex. Creative Thinking

What is the cerebellum in charge of?

What part of your brain has the most neurons? _____

What does the brain stem do?

What kind of muscles does your brain stem control?