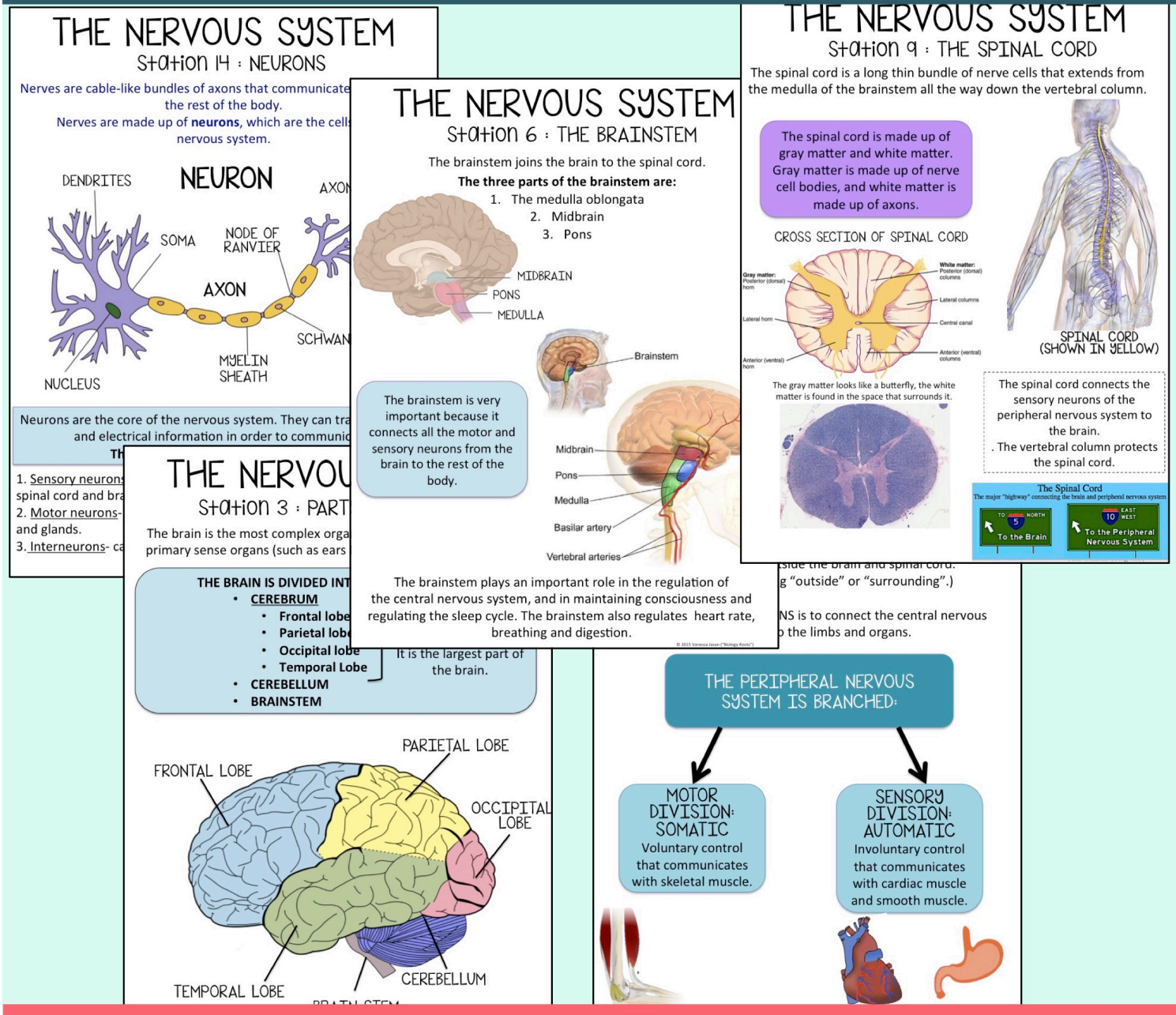
nervous system
Exhibition Stations



22 EDITABLE STATIONS GRADES 9-12

THE NERVOUS SYSTEM
Station 1: Function

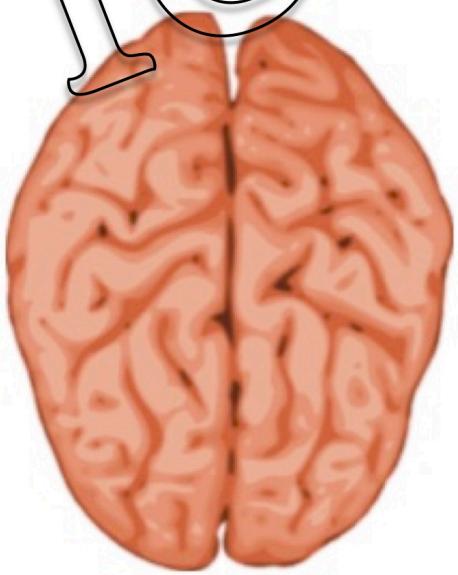
<u>The nervous system is a complex system that is responsible for:</u>

1. Communicating within the body and controlling the body
   - Examples: blinking, breathing, walking, heart rate

2. Communicating the external environment to the body
   - Example: seeing, hearing, feeling external objects such as heat or textures.

Preview

THE NERVOUS SYSTEM CONTROLS AND COORDINATES FUNCTIONS THROUGHOUT THE BODY AND RESPONDS TO EXTERNAL AND INTERNAL STIMULI.



THE FOUR MAIN PARTS OF THE NERVOUS SYSTEM:

1) BRAIN
2) SPINAL CORD
3) SENSORY ORGANS
4) NERVES

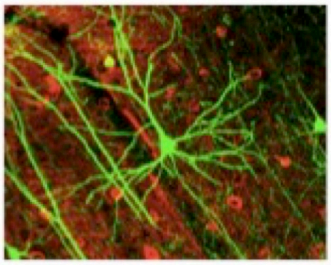
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THE NERVOUS SYSTEM

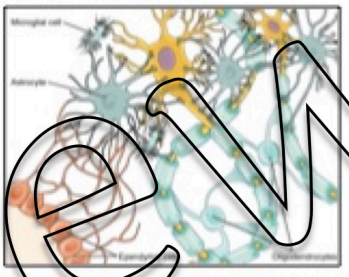
Station 2 : THE BRAIN

The brain is the most complex organ, and typically located near the primary sense organs (such as ears for hearing and eyes for seeing).

The brain is made of up two types of cells:

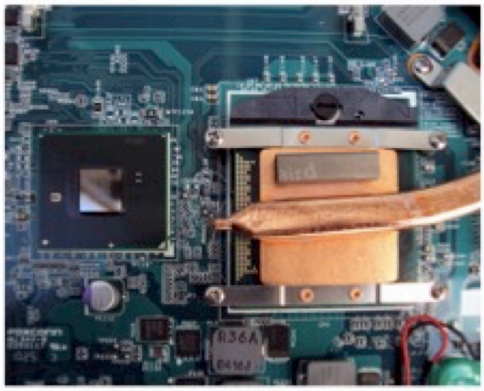


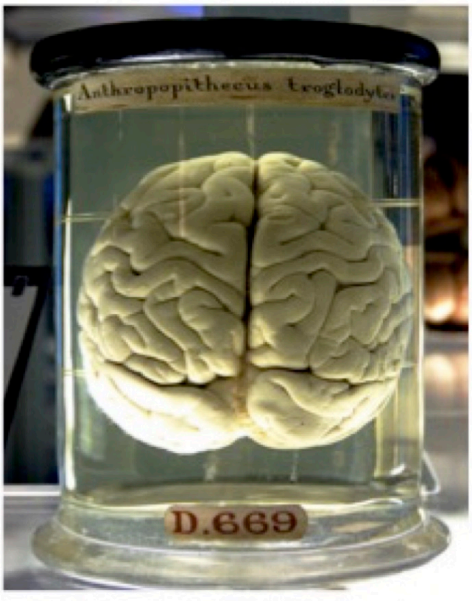
- Neurons
- Glial cells



The function of the brain is to control the other organs of the body, by generating muscle activity and secreting chemical messengers (hormones).

The brain is essentially a biological computer. It is able to interpret, process, respond to and store information.





The human brain weighs about 3 pounds and is considered to have the largest body to brain size ratio of all the animal kingdom.
For example, dolphins have the same size brains as humans, but their bodies are about 3x larger than humans.

Preview

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THE NERVOUS SYSTEM

Station 3 : PARTS OF THE BRAIN

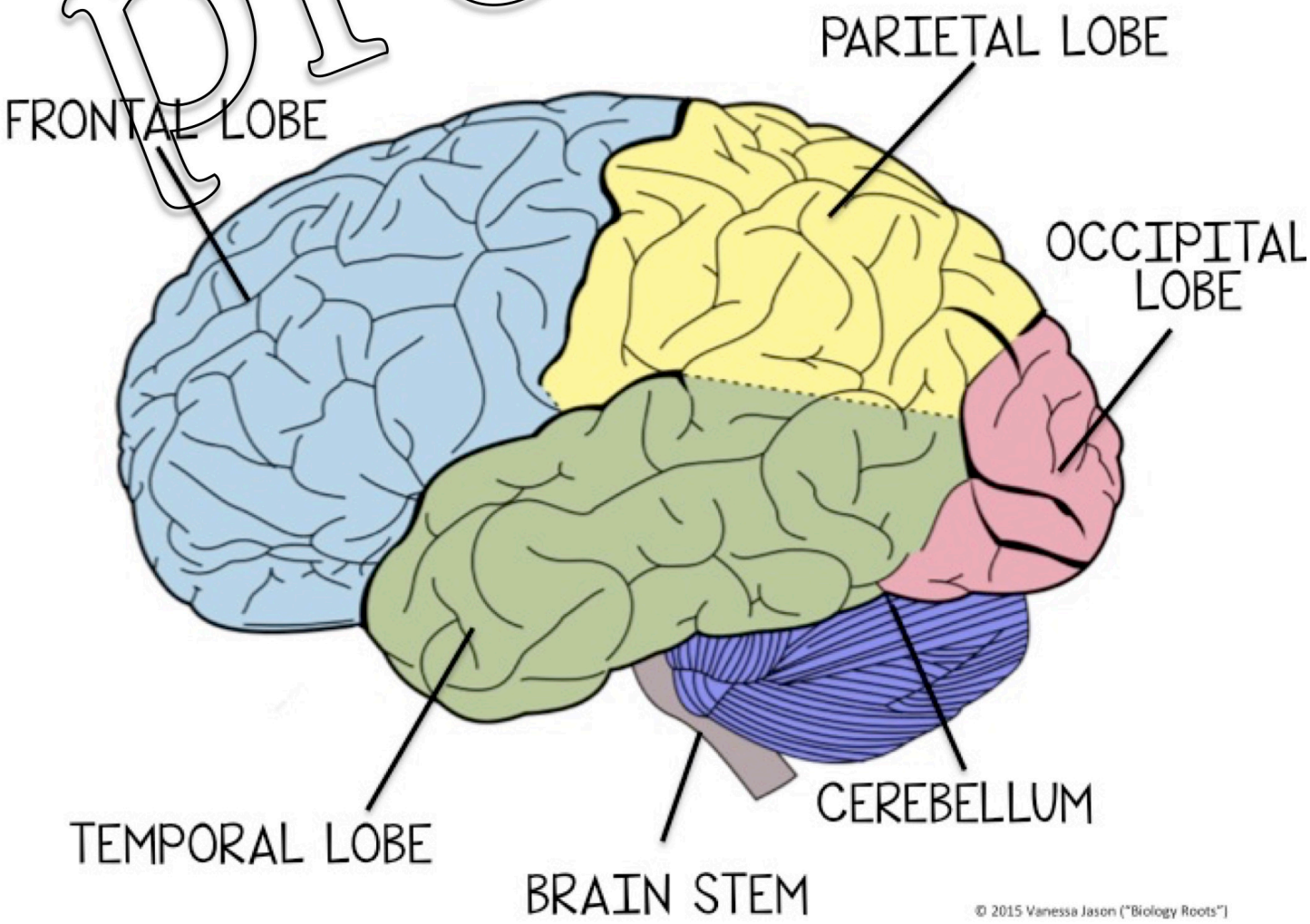
The brain is the most complex organ, and typically located near the primary sense organs (such as ears for hearing and eyes for seeing).

THE BRAIN IS DIVIDED INTO 3 GENERAL PARTS:

- **CEREBRUM**
  - **Frontal lobe**
  - **Parietal lobe**
  - **Occipital lobe**
  - **Temporal Lobe**
- **CEREBELLUM**
- **BRAINSTEM**

The cerebrum is divided into 4 lobes. It is the largest part of the brain.

preview



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THE NERVOUS SYSTEM

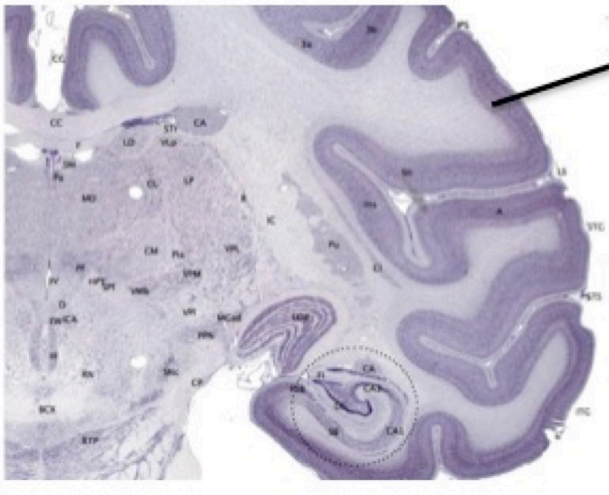
Station 4 : THE CEREBRUM

The cerebrum is the largest part of the brain, separated into 4 lobes. The lobes are separated by particular areas of the brain that each have different roles.

CEREBRAL LOBE	FUNCTION
FRONTAL	Plays a role in determining consequence, reward, as well as determining similarities and differences among objects or events.
PARIETAL	Plays a role in spatial relationships, number concepts, and sensory input from the skin.
TEMPORAL	Plays a role in language comprehension, visual memories, and emotional association.
OCCIPITAL	Acts as the visual processing center of the brain.

preview

The outer layer of the cerebrum is called the CEREBRAL CORTEX (aka gray matter).



CEREBRAL CORTEX
(gray matter outlined in violet)

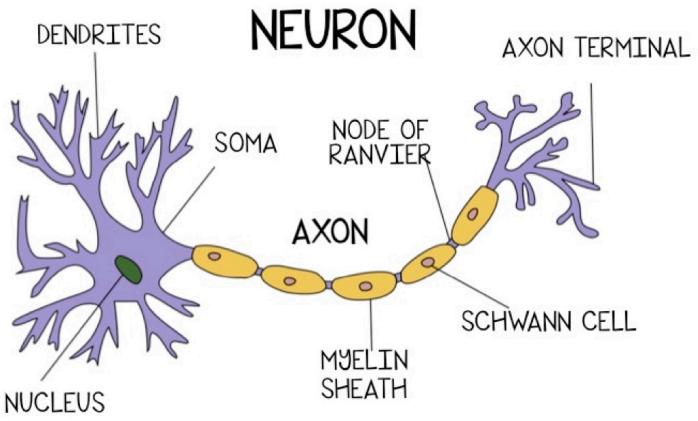
The cerebral cortex (gray matter) is made up of many bundles of neurons!

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THE NERVOUS SYSTEM

Station 14 : NEURONS

Nerves are cable-like bundles of axons that communicates the brain to the rest of the body.
Nerves are made up of **neurons**, which are the cells of the nervous system.



Neurons are the core of the nervous system. They can transit chemical and electrical information in order to communicate.
There are three categories of neurons:

1. Sensory neurons- carry impulses from the sensory organs to the spinal cord and brain.
2. Motor neurons- carry impulses from spinal cord and brain to muscles and glands.
3. Interneurons- carry impulses between sensory and motor neurons.

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THE NERVOUS SYSTEM

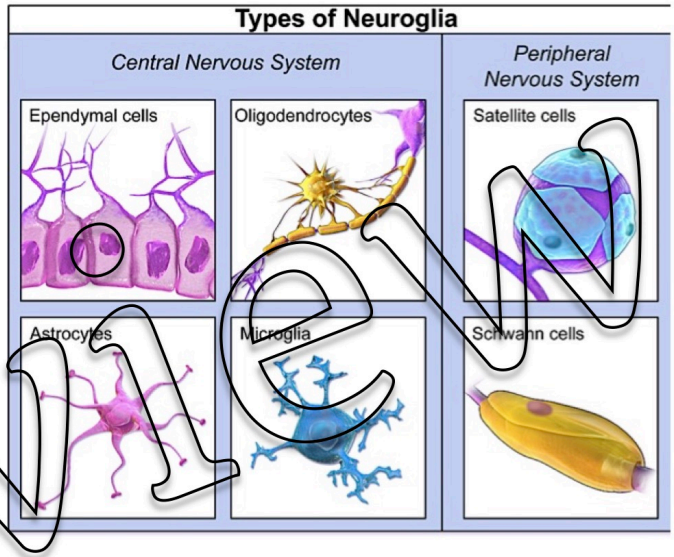
Station 15 : GLIAL CELLS

Glial cells are helpers of neural cells.

Functions of glial cells:

1. To surround neurons and help hold them in place.
2. To supply nutrients and oxygen to neurons.
3. To insulate neurons so that they are not directly touching.
4. To remove dead neurons and destroy foreign invaders.

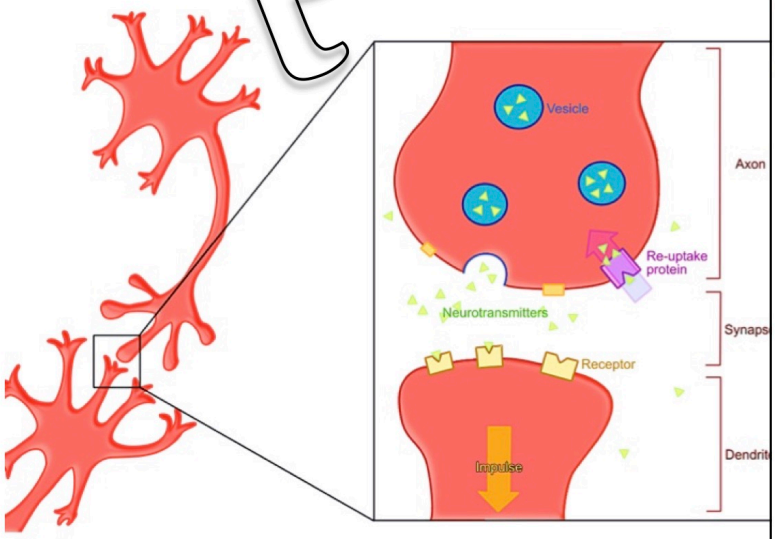
The function depends on the type of glial cells.



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THE NERVOUS SYSTEM

Station 17 : NEUROTRANSMITTERS CONTINUED



Neurotransmitters are communicated from neuron to neuron. They are released through the axon terminal of one neuron and attached to receptors on the dendrite of another neuron.

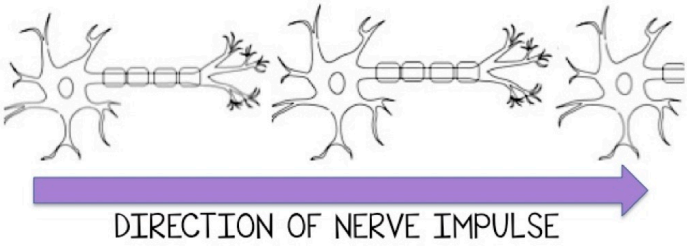
The neurotransmitters are simply messengers. They can deliver messages from the brain to other body parts and vice versa. The message depends on which type of neurotransmitter it is. For example, adrenaline usually means "fight or flight".

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THE NERVOUS SYSTEM

• Station 18 : NERVE IMPLUSE

A NERVE IMPULSE is an electrical transmission across neurons.

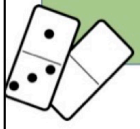


DIRECTION OF NERVE IMPULSE

Nerve impulses travel from AWAY from the cell body towards the axons.
Nerve impulses begin when a neuron is stimulated by another neuron or its environment.

Threshold- the minimum level of stimulus that must be reached in order for an impulse to occur.

All impulses are the same strength. If the stimulus reaches the threshold, there will be an impulse. If it is not enough, it will not reach the threshold and nothing will happen.
This is called the "ALL OR NOTHING" rule.



The all or nothing rule is like playing dominoes. As long as you push on the domino just enough, they will fall. However, if you don't push enough, they will not move.

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Preview

NAME: _____ DATE: _____

THE NERVOUS SYSTEM EXHIBITION LAB

STATION 1: FUNCTIONS AND PARTS

1. _____ within the body and _____ the body.
   - Examples: _____
2. Communicating the _____ _____ to the _____.
   - Examples: _____, _____, feeling external objects such as _____ or _____.

The main parts of the nervous system are: 1) _____, 2_____, 3)_____ and 4) _____.

STATION 2: THE BRAIN

The brain is the most _____ organ, and is typically located near the primary _____ _____.

The brain is made up of two types of _____:
1) _____
2) _____

How is the brain like a computer?

_____
_____
_____

The human brain has the largest _____ to _____ size _____.

STATION 3: PARTS OF THE BRAIN

The brain is divided into ____ parts:

1) _____
2) _____ _____
3) _____

LABEL THE PARTS OF THE BRAIN:



STATION 4: THE CEREBRUM

The cerebrum is the _____ part of the brain, separated into _____.

CEREBRAL LOBE	FUNCTION
Frontal	Plays a role in determining _____, _____, as well as determining _____ and _____ among objects and events.
Parietal	Plays a role in _____ relationships, _____ concepts, and sensory input from the _____.
Temporal	Plays a role in _____ comprehension, _____, _____, and _____ association.
Occipital	The _____ _____ of the brain.

The outer layer of the cerebrum is called the _____ _____ and is made up of _____ _____.



THE NERVOUS SYSTEM EXHIBITION LAB

STATION 5: THE CEREBELLUM

Why does the cerebellum contain more neurons than any other part of the brain?

_____
_____.

PRIMARY ROLE

The cerebellum plays an important role in _____.

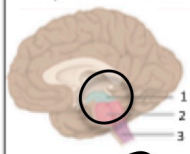
It helps with:
- _____ _____ and timing of _____

And it controls
- _____ and
- _____

SECONDARY ROLE- The cerebellum plays a small role with _____, _____ and mental _____.

STATION 6: THE BRAINSTEM

Three parts of the brainstem:



The brainstem _____ all the motor and sensory _____ from the _____ to the rest of the _____.

The brainstem...
- Maintains _____
- Regulates....
- The _____ cycle
- _____
- _____
- _____

STATION 7: CEREBRAL PALSY

Cerebral palsy is a wide range of conditions that affects body _____ and _____ _____.

Caused by faulty _____ or _____ to motor areas of the _____.

Symptoms may include:
- Poor _____
- _____ or _____ muscles
- Trouble _____ or swallowing
- _____ body tremors

STATION 8: ALZHEIMER'S DISEASE

What is Alzheimer's? _____ _____.

How are Alzheimer's patients brains different than others? _____.

What can help reduce the chances of acquire Alzheimer's? _____
_____
_____.

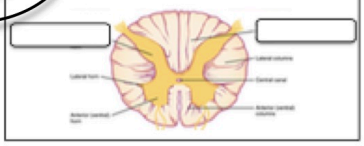
STATION 9: THE SPINAL CORD

The spinal cord is a long _____ of _____ cells that extends from the medulla of the _____ all the way down the _____ column.

The spinal cord is made up of _____ matter and _____ matter.

The spinal cord connects the _____ neurons of the peripheral nervous system to the _____

What protects the spinal cord? _____



Preview

STATION 10

NERVOUS SYSTEM

Relays messages, processes info, analyzes data. Involves the _____

Receives information from _____ t and relays commands from CNS to _____ and _____.

Transmits impulses from CNS to _____ and glands

Transmits impulses from _____ _____to the CNS

Regulates activities under _____ _____
ex) movement of skeletal muscles

Regulates_____ activities
ex) _____
_____
_____

STATION 11: CENTRAL NERVOUS SYSTEM

Functions of the CNS:
- _____ _____ _____ from all parts of the _____.
- _____ and _____ all parts of the body.

The CNS is protected by the _____ and _____ _____.

STATION 12: PERIPHERAL NERVOUS SYSTEM

Where is the PNS located? _____
_____

Function of the PNS: _____
_____

What categories is the PNS divided into?
_____
_____
_____
_____.

STATION 13: BRAIN SURGEONS

_____ is the study of the brain and nervous system.

Brain surgeons are known as _____.

How many years of school do you need to become a brain surgeon? _____



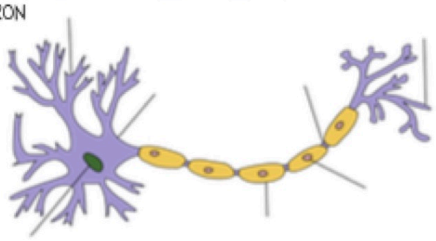
STATION 14: NEURONS

What are nerves? _____
_____.

Nerves are made up of _____, which are the _____ of the _____.

Neurons can transit _____ and _____ information in order to _____.

LABEL THE NEURON



THREE TYPES OF NEURONS

Sensory	Carry impulses from the _____ _____ to the spinal cord and _____.
Motor	Carry impulses from the _____ _____ and _____ to the_____ and glands.
Interneuron	Carry impulses _____;

Who are the nodes of Ranvier named after? _____
Who are Schwann cells named after? What do they do? _____
_____.

The soma is the technical term for the _____ _____, which contains the _____.
Dendrites are projections of the cell body that can _____
from _____ via synapses.
The myelin sheath acts as an _____ which helps _____ the rate of _____.

nervous system
Exhibition Stations

GRADES 9-12

<u>22 STATIONS:</u>

- PARTS AND FUNCTION OF THE NERVOUS SYSTEM
- PARTS OF THE BRAIN
- CENTRAL AND PERIPHERAL NERVOUS SYSTEMS
- NEURONS AND HOW THEY COMMUNICATE
- GLIAL CELLS
- NEUROTRANSMITTERS
- MEMBRANE POTENTIAL
- INTERESTING FACTS