**Nervous System Notes Part 2: Brain & Divisions of NS**

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| **Questions** | **Notes** |
| **What are the 2 major divisions in the nervous system?****What 2 organs make up the CNS?****What 3 structures protect the brain & spinal cord?****What is meningitis?****What is hydrocephalus?****What are the 4 regions of the brain?****Name the lobes found in the cerebrum.****Where is the diencephalon located?****Describe the brain stem.****What is the function of the spinal cord?****What is another name for CVA?****Describe Alzheimer’s disease.****What structures make up the peripheral nervous system?****What are the 2 major divisions if the PNS?****How are impulses transmitted in the sensory & motor divisions?****What activities are regulated by the somatic & autonomic system?** **What are the 2 divisions of the autonomic nervous system?****Which system is responsible for reflexes?****What is the pathway an reflex impulse travels?****How is homeostasis maintained?** | **III. Divisions of the Nervous System*** The human nervous system has \_\_\_\_\_\_\_\_\_\_ major divisions:

**A. Central Nervous System (CNS)** * \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of the body
* The central nervous system relays messages, processes information, and analyzes information.
* Made of two parts:

i. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * + Impulses flow to and from the brain
	+ 100 billion neurons, mainly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

ii. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* + Main \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between brain and the rest of the body
	+ Processes information such as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
1. Protection of the CNS
* Brain and spinal cord are protected by:
* a] \_\_\_\_\_\_\_\_\_\_\_ - skull, and vertebrae
* b] \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - layers of connective tissue that surrounded the organs
* c] Cerebrospinal \_\_\_\_\_\_\_\_\_\_ – fluid found in between meninges and organ
	+ Acts as a shock absorber
	+ Continually circulates around the brain
* DISEASE: Meningitis
	+ Inflammation of the meninges
	+ Can be caused by an viral , bacterial or microorganism infection
	+ Causes headaches, neck stiffness, confusion, sensitivity to light and sound
	+ Can be life threatening
* DISEASE: Hydrocephalus (“water on the brain”)
	+ Accumulation of CSF in the brain
	+ Exerts pressure on the brain causing brain damage

2. Regions of the Brain (Four Regions: Cerebral Hemispheres, Diencephalon, Brain Stem, Cerebellum)a. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (Cerebrum)* Left and right hemispheres
* Left brain – logic, language, math
* Right brain – creativity, intuition, art, music
* Connected by the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (communication link between left and right
* The surface is made of ridges (\_\_\_\_\_\_\_\_) and grooves (\_\_\_\_\_\_\_)
* Fissures (deep grooves) divide the cerebrum into four lobes
1. \_\_\_\_\_\_\_\_\_\_\_\_\_ lobe: visual integration
2. Parietal lobe – spatial knowledge, math
3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_ lobe – memories, auditory, language
4. Frontal lobe – emotion, future planning, judgment, muscle movement, language
* \_\_\_\_\_\_\_\_\_\_\_ System – involved in emotion, motivation, arousal, memory, and learning
	+ Amygdala - \_\_\_\_\_\_\_\_\_\_\_
	+ Hippocampus - \_\_\_\_\_\_\_\_\_\_\_\_\_ formation

b. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * Relay and control center
* Sits on top of the brain stem
* Two main parts
* \_\_\_\_\_\_\_\_\_\_\_\_ - relay between sensory areas and cerebrum
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ - regulates involuntary responses and hormone secretions of the pituitary gland

d. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ * “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_” inferior and posterior to cerebral cortex
* Coordination, posture, motor learning

c. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_* \_\_\_\_\_\_\_\_\_\_\_\_\_ brain to the spinal cord
* Parts of the brain stem
* Midbrain – vision, hearing, motor control
* Pons – breathing, sleep
* Medulla oblongata – involuntary activity

(breathing, heart rate, blood pressure)1. Spinal Cord
* Cylinder of nervous tissue that begins at the \_\_\_\_\_\_\_\_\_ of the brain
* Protected by the vertebral column & meninges
* Spinal nerves extend from the cord through each vertebrae
* Main \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ link between the brain and rest of body
1. Traumatic Brain Injuries & Diseases
* Concussion, Contusion, Cerebral edema
* Cerebrovascular Accident (CVA)
	+ Commonly called a stroke
	+ The result of a blocked or ruptured blood vessel supplying a region of the brain
	+ Brain tissue supplied with oxygen from that blood source dies
	+ Loss of some functions or death may result
* Alzheimer’s Disease
* Progressive degenerative brain disease
* Mostly seen in the elderly, but may begin in middle age
* Structural changes in the brain include abnormal protein deposits and twisted fibers within neurons
* Victims experience memory loss, irritability, confusion, hallucinations and death

peripheral_nervous_system1. **Peripheral Nervous System (PNS)**
* The peripheral nervous system is made up of all the \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ (nerve cell bodies) that carry messages between the body and the central nervous system (CNS)
* Receives information from the environment and transmits commands from CNS to organs and glands
* Contains mostly \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ neurons

**Divisions of the PNS**Sensory Division Motor Division Somatic NS Autonomic NS SympatheticParasympathetic

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| Sensory division | Motor division |
| * transmits impulses from \_\_\_\_\_\_\_\_\_\_\_\_ organs to the central nervous system
 | * + transmits impulses from the central nervous system to the muscles or glands
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| Motor Division is subdivided into 2 divisions |
| Somatic | Autonomic |
| * Regulates activities that are under \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ control
* Example: movement of muscles (wiggle toe)
* Involved in \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (quick, automatic response to stimulus)
 | * Regulates activities that are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or involuntary
* Example: heart rate
* Consists of only motor nerves
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| Autonomic Division is subdivided into 2 divisions |
| Sympathetic division | Parasympathetic division |
| * “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_”
* Takes over to increase activities
* Remember as the “\_\_\_\_\_” division = exercise, excitement, emergency, and embarrassment
 | * Housekeeping activities
* Conserves energy
* Maintains daily necessary body functions
* Remember as the “\_\_\_” division = digestion, defecation, and diuresis (urination)
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* **Peripheral Nervous System & Reflexes**
* The peripheral nervous system is also involved in reflexes.
* A *\_\_\_\_\_\_\_\_\_\_\_\_\_* is a quick and unconscious response to a stimulus
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_ with reflexes.
* The impulse travels up sensory neurons, to the spinal cord (interneuron), then immediately travels down motor neurons for a response.
* The pathway the impulse travels is called the *\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_*

**\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (sense organ) 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ neuron 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 🡪 \_\_\_\_\_\_\_\_\_\_\_ neuron 🡪 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ (muscle)*** Internal Communication
* Internal communication is critical to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Sensory neurons are constantly sending information to the brain about the internal environment.

The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ by sending signals through the motor neurons to maintain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. |

**Learning Goals**

1. Compare and contrast the CNS and PNS in terms of their structures and functions.
2. Describe the four lobes of the brain and what types of activities each controls.
3. Compare and contrast the sympathetic and parasympathetic divisions of the autonomic NS.
4. Explain the importance of a reflex and how reflexes can occurs so quickly.