

Parts of the Central Nervous System

EQ: Compare and contrast the different parts of the brain and their functions.

- I. Interesting Brain Facts
 - a. No pain receptors in the brain – the brain feels no pain
 - b. The brain weighs only about 3 lbs
 - c. It's the fattest organ in the body – 60% fat
 - d. Your brain uses 20% of the total oxygen in your body
 - e. You produce 10-23 watts of power while awake
 - f. Though only 2% of our body weight, it uses 20% of our bodies energy
 - g. The brain is suspended in **Cerebrospinal fluid**, effectively floating in liquid that acts as both a cushion to physical impact and a barrier to infections.
- II. Brain Region #1 Cerebrum
 - a. Largest of the regions and most superior part of brain
 - b. Controls higher mental function
 - c. Two hemispheres; left and right divided by the longitudinal fissure
 - d. Crowned by a cortex of gray matter
 - e. Markings on Cerebrum
 - i. Gyri (ji're): the ridges
 - ii. Sulci (sul'ki): grooves
 - iii. Fissures: deep grooves
 - iv. Lobes: different parts of cerebrum created by the fissures & sulci
 - f. Cerebral Hemispheres - left and right side separated by the corpus callosum; connects two hemispheres
 - g. Cerebral Cortex
 - i. Speech, memory, logical and emotional response, consciousness, sensation, voluntary movement
 - ii. Divided into lobes named after the skull bones
- III. The Lower or "Lizard" Brain
 - a. The basic **lower brain** consists of the **spinal cord, brainstem** and **diencephalon**
 - b. Brain Region #2 – Diencephalon
 - i. Found under the cerebrum and above the brain stem
 - ii. Contains the thalamus and the hypothalamus
 - iii. They make up the "limbic system" where thirst, appetite, sex, pain, and pleasure centers are located
 - iv. Thalamus is an important relay station
 - c. Region #3 – The Brain Stem
 - i. 3 main structures; midbrain, pons, and medulla oblongata
 - ii. Midbrain: handles visual & auditory systems as well as eye movement
 - iii. Pons: breathing center
 - iv. Medulla oblongata: centers for heart rate, bp, breathing, swallowing, vomiting, etc
 - v. regulates visceral functions (autonomic system)
 - d. Region #4 – Cerebellum
 - i. Timing of skeletal muscle activity as well as balance and equilibrium
- IV. Protection of CNS
 - a. The Meninges
 - i. Dura mater – "tough mother" outermost layer
 - ii. Arachnoid - "spider web" middle layer
 - iii. Pia mater – "gentle mother" clings tightly to the brain

b. Cerebrospinal Fluid (CSF)

- i. For further protection, the brain and spinal cord float in a sea of cerebrospinal fluid within the skull and spine
- ii. Ventricles of the brain
 - 1. Fluid filled cavities, contain CSF
- iii. Hydrocephalus
 - 1. CSF forms and drains at a constant rate
 - 2. A blockage can result in too much CSF in the brain leading to hydrocephalus

V. Blood Brain Barrier

- a. A barrier of the least permeable capillaries around the brain
- b. The blood–brain barrier acts very effectively to protect the brain from many common bacterial infections
- c. But it is useless against fat soluble molecules like alcohol, nicotine, and most anesthetics