THE HUMAN NERVOUS SYSTEM

Cooperative Activity

Group Members: ***List the names of the members of your group according to their job title.***

Task master _____

Reader _____

Presenter _____

Recorder _____

A.) Introduction:

The human nervous system has two main divisions:
The Central Nervous System (CNS), and the Peripheral Nervous System (PNS). There are also highly developed sense organs that provide the nervous system with a constant supply of information about the internal and external environments.

After completing this activity, you should be able to:

1. Describe the functions of the skull, spinal column, and meninges
2. Name the functions of the major parts of the brain
3. Describe the two subdivisions of the Peripheral Nervous System
4. Compare and contrast the different types of human behavior

What is the purpose of this activity?

_____

_____

_____

B.) <u>The Central Nervous System</u>:

The central nervous system consists of the **brain** and **spinal cord.**

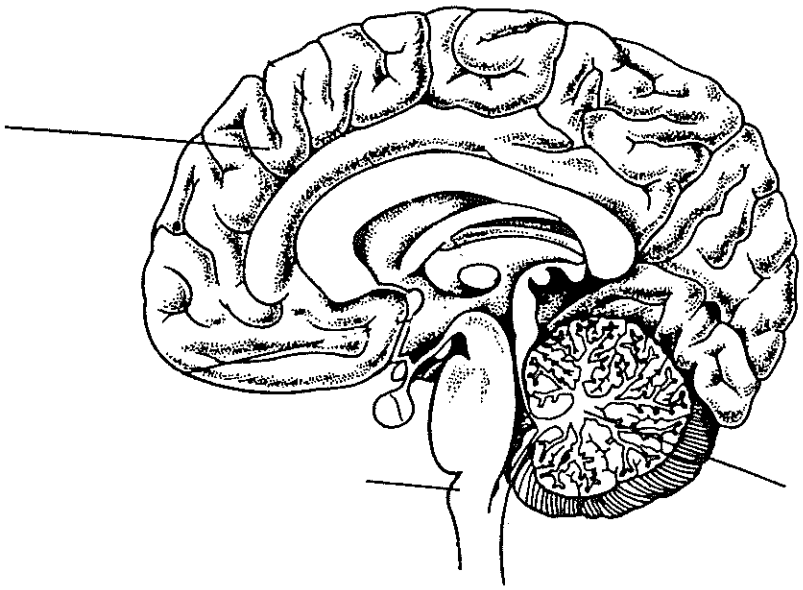
1. **The Brain**

The brain is a large mass consisting mostly of interneurons enclosed by the cranium of the skull and protected by a set of three membranes called **meninges**. The brain has <u>three</u> major divisions; the **cerebrum**, the **cerebellum**, and the **medulla**.

The **cerebrum** is the largest part of the human brain. It controls speech, voluntary movement, all the senses, memory, reasoning, and intelligence. ***In the diagram below, label the cerebrum and color it yellow.***

The **cerebellum** is located at the back of the brain below the cerebrum. The cerebellum coordinates motor activities and aids in maintaining balance. ***In the diagram below, label the cerebellum and color it red.***

The **medulla** is located beneath both the cerebrum and cerebellum. It is the extension at the top of the spinal cord. The medulla controls important reflexes, along with involuntary and automatic activities. ***In the diagram below, label the medulla and color it blue.***



Questions:

1. **Coordination of motor patterns and balance occurs mainly in the**

   _____

2. **If a person had a speech impediment, which part of the brain would contain the malfunction?**

   _____

3. **Which part of the brain is the largest?** _____

2. **The Spinal Cord**

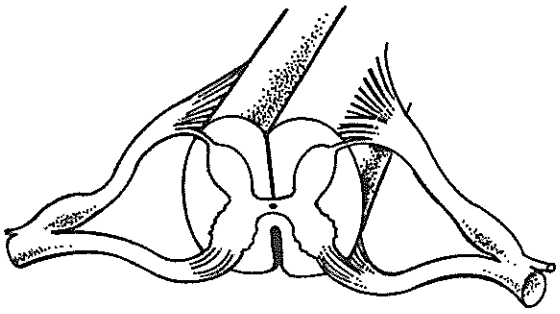
The spinal cord is the other part of the Central Nervous System. It runs down from the medulla to the base of the spine.

The functions of the spinal cord are to transmit impulses to and from the brain and to act as a reflex center.

The spinal cord is enclosed and protected by the vertebrae of the spinal column.

There are thirty-one pairs of spinal nerves that carry impulses to and from the rest of the body.

On the diagram below, label the spinal cord, and a spinal nerve.



Questions:

1. **Briefly explain some of the functions of the spinal cord:**

_____

_____

2. **How is the spinal cord protected?**

_____

3. **How many pairs of spinal nerves arise from the spinal cord?**

_____

4. **Briefly explain why people who severely break their neck often become paralyzed:**

_____

_____

_____

C.) The Peripheral Nervous System:

From the brain and spinal cord, pairs of nerves extend to all parts of the body. These nerves make up the **Peripheral Nervous System.** There are two subdivisions of the Peripheral Nervous System; the **somatic nervous system,** and the **autonomic nervous system.**

1. The Somatic Nervous System

The somatic nervous system consists of all the nerves that control the voluntary muscles.

Nerves that receive stimuli from the sense organs are also part of the somatic nervous system.

2. The Autonomic Nervous System

The autonomic nervous system consists of the nerves that control the heart muscles, glands, the smooth muscles of the digestive organs, and other organs not under conscious control.

It is considered to be an involuntary system, although there is some overlap with conscious control. For example, breathing is ordinarily unconscious, but we can consciously control breathing to some extent.

Each organ of the autonomic nervous system is controlled by a pair of nerves that have opposite effects. If one nerve causes an organ to speed up, then the other causes it to slow down. Pairs of nerves that have opposite effects are said to be **antagonistic.**

Questions:

1. **The structures innervated by the somatic nervous system are under**

   _____ **control.**

2. **What is the meaning of the term "autonomic"?**

   _____

3. **Give an example of an activity that is controlled by the somatic nervous system:**

   _____

4. **Give another example of an activity that is usually controlled by the autonomic nervous system, but can also be controlled by the somatic nervous system to some extent:.**

   _____

D.) Human Behavior:

Human behaviors can be classifies as either **involuntary**, or **voluntary**.

1. **Involuntary Behaviors**
These are behaviors that occur automatically, without requiring conscious control. Some involuntary behavior is already present at birth and is known as **inborn behavior.**

Simple reflexes are present at birth, and do not require conscious thought.

Conditioned behaviors are automatic behaviors that are acquired, such as a habit. They form by repetition of an action that establishes a constant nerve pathway and so responses to certain stimuli become rapid and automatic.

2. **Voluntary Behaviors**
These are conscious behaviors that involve the cerebrum of the brain. It makes use of memory, association of ideas, imagination, and judgment to choose a particular response.

Questions:

1. **Describe an example of an inborn behavior:**

_____

_____

2. **The type of behavior in which a new stimulus initiates a repeated response is called a _____**

3. **A _____ is an involuntary, automatic response to a given stimulus.**

4. **Briefly compare and contrast a voluntary behavior and an involuntary behavior:**

_____

_____

_____

_____