Name_____ Date_____

The Brain

Reading and Discussion

The brain is the center of the human nervous system, as it is for most other animals. The nervous system transmits and processes information about the world to the brain, causing the appropriate reactions in the body. In humans, most information is routed through the **central nervous system**.

The central nervous system consists of the **spinal cord** and the **brain**. The brain is where information is processed and stored, and it is responsible for controlling bodily functions and thought. **Neuroscience** is the science that studies the central nervous system, including the brain.

In adult humans, the brain weighs approximately three pounds. The brain itself is soft tissue that is generally white or pink in color. It is made up of several parts and sections, and each section has a different purpose. The brain, or **cerebrum**, can be divided down the middle and split into two main sections called hemispheres. The hemispheres are divided into four different lobes. Neuroscientists divide the hemispheres into lobes based on the structure of the bones around the actual brain itself. The four lobes are:

1. the **frontal** lobe;
2. the **parietal** lobe;
3. the **temporal** lobe;
4. the **occipital** lobe.

The **frontal lobe** is located in the front part of the cerebrum. This section reaches maturity when a person is about twenty-five years old. It handles the functions of planning, emotions, and parts of speech. It is also where most of the personality is based. This means that it controls a lot of a person's behavior and expressions. Because this lobe is so large and located in the front of the skull, the majority of injuries to the brain occur to this lobe.

The **parietal** lobe is located above the occipital lobe and behind the frontal lobe. This part of the cerebrum handles information related to touch, temperature, pain, and pressure. This lobe coordinates sensory information and enables the person to correctly perceive their environment as one complete whole. If this area is damaged, a person may have difficulty with coordination, movement, or recognition that his or her body is in pain.

The **temporal** lobe is located on the side of the cerebrum. The main purpose of this lobe is to interpret auditory data. This means that it processes information that a person receives through their sense of hearing. This lobe also plays a role in both speech and memory. It is believed that the temporal lobe helps when the brain is transferring memories from short term to long term.

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The **occipital** lobe is the part of the brain that manages data received through the sense of vision. This lobe is located behind and below the parietal and temporal lobes. This part of the brain allows us to distinguish shapes and colors and to process what our eyes see.

The different parts of the brain are made up of special cells. These cells are called **neurons**. It has been estimated that there are about one-hundred billion neurons in the average brain. Neurons are similar to other living cells, yet they are also unique because they form connections between each other. This connection is called a **synapse**, which is a connection caused by an electrochemical process, enabling neurons to transmit information between one another. Not all neurons are alike, however. Because neurons are so active and communicate so quickly, they come in various shapes and sizes.

As with the other parts of the body, blood is transported to the brain by blood vessels. The brain requires between 15% and 20% of the blood in the body. It has a complex system of blood vessels that ensures that the brain never stops getting the materials it requires to function like oxygen and carbohydrates. Waste materials, like ammonia and carbon dioxide, are removed from the brain by the blood in the blood vessels. However, blood is not the only fluid in the brain. CSF, or **cerebrospinal** fluid, surrounds the brain. The purpose of this fluid is to buffer the brain and help support its mass. This fluid protects the brain in case a person suffers a blow to the head. It also prevents the weight of the brain from pressurizing to the base of the brain. In other words, the brain seems to float in this liquid.

The brain is a complex organ with many parts that interact with one another. These interactions occur on the small cellular level as well as on the level of blood vessels and the skull. Neuroscientists continue to study the brain to learn more about its functions and to learn how to improve the health of the human brain.

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Activities

Activity A: Fill in the Blanks.

1. The brain is the center of the _____ in humans and most other animals.

2. The _____ is where information is processed and stored.

3. The brain, or cerebrum, can be divided down the middle and split into two main sections called _____.

4. This lobe handles the functions of planning, emotions, and parts of speech: _____.

5. However, blood is not the only fluid in the brain. CSF, or _____ surrounds the brain.

6. The _____ is the part of the brain that manages the data we receive through the sense of vision.

7. _____ is the science that studies the central nervous system, including the brain.

8. The temporal lobe is located on the side of the _____.

9. A _____ is a connection caused by an electrochemical process enabling neurons to transmit information between one another.

Activity B: True or False:

____ 1. The parietal lobe is located above the occipital lobe and behind the frontal lobe.

____ 2. The brain requires between 15% and 20% of the blood in the body.

____ 3. The occipital lobe plays a role in both speech and memory.

____ 4. The parietal lobe section reaches maturity at about twenty-five years old.

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Answer Key

Activity A

1. The brain is the center of the __nervous system__ for humans and for most other animals.

2. The __brain___ is where information is processed and stored.

3. The brain, or cerebrum, can be divided down the middle and split into two main sections called _hemispheres__.

4. This lobe handles the functions of planning, emotions, and parts of speech: _frontal lobe_.

5. However, blood is not the only fluid in the brain. CSF, or cerebrospinal fluid, surrounds the brain.

6. The __occipital lobe___ is the part of the brain that manages the data that a person receives through their sense of vision.

7. __Neuroscience_ is the science that studies the central nervous system, including the brain.

8. The temporal lobe is located on the side of the __cerebrum__.

9. A _synapse__ is a connection that is caused by an electrochemical process that enables the neurons to transmit information between one another.

Activity B

_T_ 1. The parietal lobe is located above the occipital lobe and behind the frontal lobe.

_T_ 2. The brain requires between 15 and 20% of the blood in the body.

_F_ 3. The occipital lobe plays a role in both speech and memory.

_F_ 4. This parietal lobe section reaches maturity at about twenty-five years old.