

Name _____

Explore the Neuroscience for Kids Web Site

(This worksheet was created by Joyce Taaffe, at teacher at Wheeler High School, Marietta, GA.)

START AT: <http://faculty.washington.edu/chudler/neurok.html>

Click on the Table of Contents item, “Explore the Nervous System.” Then, click on the box labeled “The Neuron” to answer the following questions:

1. A neuron is a _____ cell. The brain is made up of about _____ billion neurons.
2. Neurons are similar to other cells in the body in some ways such as:
 - a. Neurons are surrounded by a _____.
 - b. Neurons have a _____ that contains _____.
 - c. Neurons contain cytoplasm, mitochondria and other _____.
3. However, neurons differ from other cells in the body in some ways such as:
 - a. Neurons have specialized projections called _____ and _____.
 - b. Dendrites bring information to the _____, _____, and _____ take information away from the cell body.
 - c. Neurons communicate with each other through an _____ process.
4. Neurons form specialized connections called _____ and produce special chemicals called _____ that are released at the synapse.

Click on “type of Neurons” to fill in this chart. Scroll down to the end of the pictures of neurons, where there is a chart comparing axons and dendrites. Fill in the answers:

There are several differences between axons and dendrites:

AXONS

Take information _____ the cell body

_____ Surface

Generally only _____ per cell

No _____

Can have _____

Branch further from the cell body

DENDRITES

Bring information _____ the cell body

_____ Surface (dendritic spines)

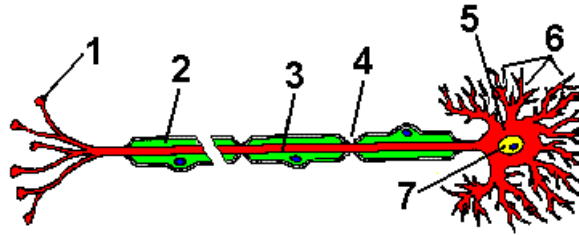
Usually _____ per cell

Have ribosomes

No _____ insulation

Branch _____ the cell body

Take the neuron quiz at the bottom of the web page, and correctly answer these questions:



1. Part of the neuron that releases neurotransmitters into the synaptic cleft. _____.
2. Fatty material that surrounds some axons. _____.
3. Takes information away from the cell body. _____.
4. The gaps in the myelin sheath. _____.
5. Part of neuron that contains the nucleus. _____.
6. Takes information to the cell body. _____.
7. Organelle in neuron that contains genetic material. _____.

Go back to “Exploring the Nervous System.”

Click on the box, “Brain Basics.”

Click on “Divisions of the Nervous System” to answer these questions:

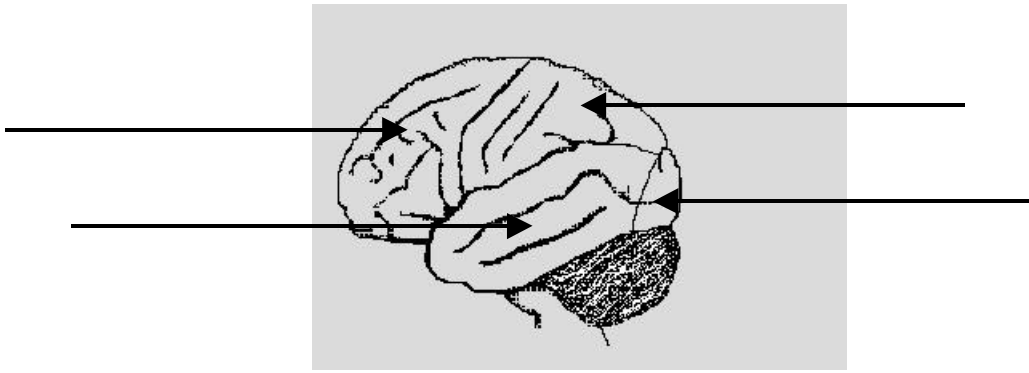
1. What is the definition of “neuroanatomy?” _____
2. The nervous system can be divided into "systems" -- what are they?
_____ and _____
3. The **central nervous system** is divided into two major parts. What are they?
_____ and _____
4. The brain contains about 100 billion nerve cells (neurons) and trillions of support cells called _____.
5. The **peripheral nervous system** is divided into two major parts, the _____ nervous system and the _____ nervous system, and a third part called the _____ nervous system.
6. The **somatic** nervous system consists of peripheral nerve fibers that send sensory information to the _____ nervous system AND motor nerve fibers that project to _____.
7. The **autonomic nervous** system is divided into three parts: the _____ nervous system, the _____ nervous system and the _____ nervous system. The autonomic nervous system _____ controls smooth muscle of the viscera (_____) and _____.
8. The _____ nervous system is a third division of the autonomic nervous system that you do not hear much about. The enteric nervous system is a meshwork of nerve fibers that innervate the viscera (_____, _____, and gall bladder).

Go up to the top of the page, and click on the last content item at the left for these brain structures:

1. The word "**cortex**" comes from the Latin word for "_____ " (of a tree). This is _____ because the cortex is a sheet of tissue that makes up the _____ of the brain.
2. The thickness of the cerebral cortex varies from _____ to _____ mm. The right and left sides of the cerebral cortex are connected by a thick band of nerve fibers called the "_____".

Go back to "Exploring the Nervous System." Click on the box "Brain Basics," then scroll down to the third listing: "Our Divided Brain: Lobes of the Brain" to answer these items.

1. Name the **4 lobes of the brain**.



2. Which lobe is concerned with **perception of stimuli** related to **touch, pressure, temperature and pain**? _____
3. Which lobe is concerned with many aspects of **vision**? _____
4. Which lobe is concerned with **reasoning, planning, parts of speech and movement** (motor cortex), **emotions, and problem-solving**? _____
5. Which lobe is concerned with perception and recognition of **auditory stimuli** (hearing) and **memory** (hippocampus)? _____
6. In the yellow section, dealing with the frontal lobe, click on the link to "What Happened to Phineas," a worker who had a large iron stake pierce his skull. Answer these questions:
 - a. In what year did the accident take place? _____
 - b. How thick was the tamping rod that went through his skull? _____
 - c. What happened after the stake went through? _____
 - d. Did the rod injure his eye? _____
 - e. What was the doctor able to do with his fingers inserted into each hole in Phineas' head?

 - f. Although Phineas recovered physically, what changed? _____

 - g. How long after the accident did Phineas die? _____
 - h. Why was his body exhumed (dug up)? _____

- i. Where is Phineas' skull today? _____
- j. The part of Phineas' brain that was damaged was most likely the _____, which controls _____.

Return to the Lobes of the Brain, and scroll down to the image of the brain with the question, "Did you Know?" To the right, click on, "More about Poor Mr. Gage." Then do the following:

Click on "Phineas' Story."

- a. How long was the tamping rod? _____
- b. How much did the rod weigh? _____
- c. How long did Phineas stay in the hospital to recover from his injury? _____
- d. Who is the doctor who treated Phineas? _____
- e. List some of the adjectives used to describe the "new" Phineas: _____, _____, _____, _____
- f. Why was Phineas not hired back to his old job after he recovered? _____

Return to "BRAIN BASICS." Scroll down to "Compare the Brains of 9 Species." Take the test to see how many brains you can identify.

- 1. How many did you answer correctly? _____
- 2. Which animal has the smallest brain of those pictured? _____
- 3. Which animal has the largest? _____
- 4. The dolphin brain is the most "convoluted" of all. What does this suggest? (The answer is not stated; can you come up with a plausible explanation?" _____

Choose one other topic from the list of items under Explore the Brain and Spinal Cord that appeals to you, and read it. Take notes below on some of the interesting/ informational points:

Finished Early? Answer these for Extra Credit

<http://faculty.washington.edu/chudler/neurok.html>

1. About how many neurons are there in the average human brain? _____
2. What features do neurons have in common with other cells in the body?

3. In what ways are neurons unique? _____

4. What's inside a neuron? _____
5. The axons of neurons differ in the speed with which they conduct neural impulses. How many different basic neural speeds are there? _____
6. Is there a relationship between the type of information conveyed by an axon and the speed at which it conducts impulses? _____
7. What defensive weapon do spiders, snakes, scorpions and some bees share in common?

8. How are these substances similar to nerve agents and other chemical weapons? _____

9. Why are glial cells referred to as the "forgotten brain cells?" _____

10. State five ways that glia differ from neurons.
 - a. _____
 - b. _____
 - c. _____
 - d. _____
 - e. _____
11. What would happen to your behavior if your glia suddenly stopped functioning?

