Name_____ Period ____ Date _____

Nervous System: Nerve Impulses

Part 1 – Neurons

Go to http://health.howstuffworks.com/brain1.htm

Read the text and answer the following questions.

1. What is a neuron? _____
2. Name & describe the 3 basic parts of a neuron.

_____

_____

_____

Part 2 – The Sodium/Potassium Pump

Go to http://www.brookscole.com/chemistry_d/templates/student_resources/shared_resources/animations/ion_pump/ionpump.html

View the animation and answer the questions.

1. How many positive sodium ions are being pumped out? _____
2. How many positive potassium ions are being pumped in? _____
3. Since the numbers are different, could this cause an imbalance of charge on either side of the membrane? _____
4. What molecule is providing the energy for this ion transport? _____
5. What is the process called when particles are being transported against the concentration gradient across a membrane? _____

Part 3 – The Nerve impulse

Go to http://highered.mcgraw-hill.com/sites/0072495855/student_view0/chapter14/animation__the_nerve_impulse.html

View the animation, by listening and/or reading text, and answer the questions.

1. When a neuron at rest, a charge difference is maintained between the inside and outside of the cell. What is the charge inside the cell at rest? _____
2. What specialized protein exists in the neural cell membrane? _____
3. What is its function? _____
4. Which ion is in high concentration outside the neuron? _____
5. Which ion is in high concentration inside the neuron? _____
5. Under resting conditions which ion leaks more? The sodium leaking inward or the potassium leaking outward? _____
6. The result of the leaks makes the outside of the cell charged _____ and the inside of the cell charged _____. The difference in charge between the interior and exterior of the cell is called _____.
7. Since sodium is in high concentration outside of the cell, which way does the sodium move if the sodium channel opens in the membrane when plasma membrane is stimulated? _____.
8. This makes the neuron's membrane momentarily _____ as the inside of the cell become _____ charged and outside of the cell will have _____ charge.
9. This depolarization along the membrane is called _____.
10. As potassium ions move rapidly out of the cell, _____ the membrane as the inside of the cell again becomes _____ while outside becomes _____.

_____

Answer quiz questions found below the animation.

1. Which of the following statements about the resting membrane potential is TRUE?

_____

2. During depolarization, which of the following statements about voltage-gated ion channels is TRUE?

_____

3. Depolarization occurs because_____
4. The sodium-potassium pump is involved in establishing the resting membrane potential. _____
5. The nerve impulse is an electrical current that travels along dendrites or axons. _____

Part 4—How neurons work?

Go to http://www.bristol.ac.uk/synaptic/basics/basics-2.html

Click on "How neurons work" and scroll down to read section on myelin. Answer questions.

1. What is myelin? _____
2. What is the importance of myelin? _____
3. How do nodes of Ranvier, coupled with myelin, help with conducting action potentials?

_____

_____

2. What does the disease Multiple Sclerosis have to do with myelin and what are its effects on the body?

_____

_____

_____

Part 5—Nerve Impulses and Myelin

Go to http://www.blackwellpublishing.com/matthews/actionp.html

View the 1st animation that shows propagation of action potential along unmyelinated axon.

1. What is happening to the charge on the outside and inside of the cell as the action potential moves. _____

View the 2nd animation that shows propagation of action potential along myelinated axon.

2. What is happening during saltatory conduction along myelinated nerve fiber?

_____

_____

3. Use a watch to determine which action potential occurs faster?

_____

Part 6—Chemical neurotransmission (Synapse)

Go to http://www.mind.ilstu.edu/flash/synapse_1.swf

View the animation and answer questions as you step through the animation.

1. Neurons communicate with other neurons at _____.
2. At the synapse the _____ of one neuron comes close to the _____ of another neuron
3. They communicate by using what kind of messengers? _____.
4. Summarize in 5 steps what happens when an action potential reaches an axon terminal.

_____

_____

_____

_____

_____