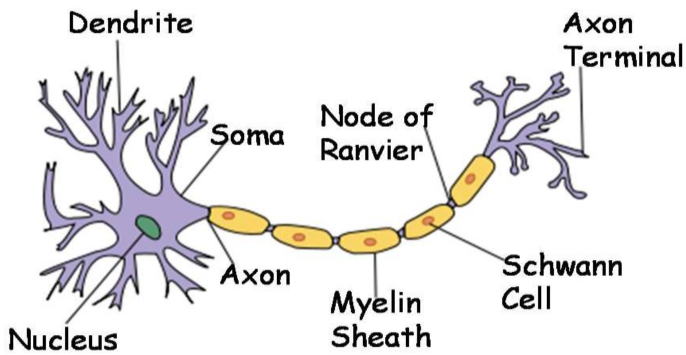
Name ____ Date ________________ Period ______

Lab: Signal Transmission in the Nervous System

BIOLOGY: CHAPTER 29

Background: The nervous system acts by taking in sensory input, integrating it in the brain or spinal cord, and then telling the body to perform some motor activity in response. A nerve impulse occurs immediately after the brain sends the signal, unlike the endocrine system, which can take days to take effect. Some large, myelinated nerves can transmit a signal at 200 meters/second.

Problem: How fast does a nerve impulse travel and what affects the speed of transmission?



Neuron (single nerve cell)

Materials:

- stopwatch
- calculator
- small bell

Procedure:

1. All students will stand in a circle.
2. Join hands with the person on both sides of you.
3. The person on the end will have a bell.
4. The person in the beginning will squeeze the hand of the person to their left and simultaneously start the stopwatch.
5. That person will then squeeze the hand of the person to his or her left.
6. When the signal reaches the last person, they will ring a bell and the person with the stopwatch will stop it. (record in data table below)
7. The class will measure the span from fingertip to fingertip (in meters) of several students in the class, finding an average, then multiply that number by the number of people in the class. This will give you the **total distance** that the nerve impulse has travelled. (record in data table below)
8. Given the number of people and length per person, divide the distance in meters travelled by the time in seconds to determine the speed in meters/second.
9. Repeat 5 times and determine the average speed in meters/second. (record in the space below)

Trial	1	2	3	4	5
Time (s)					
Distance (m)					
Speed (m/s)					

Average speed = _____________

Questions:

1. You will notice that the speed you calculate is remarkably slower than 200 m/s, the transmission speed of some axons. Why is this?

2. From when you feel the person on your right squeeze your hand, to when you squeeze the person's hand on your left, list the processes that must take place in order for this to occur.

3. Describe other body systems (besides the nervous system) that are involved in this activity and how they are involved.

4. How might you more accurately calculate the speed of transmission? (What might you do differently?)

5. What might be some possible sources of error in this experiment?