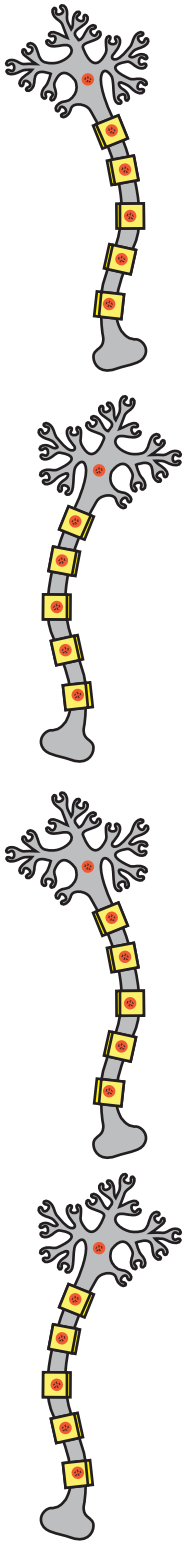
Modeling Neurons and Neuronal Structures



Student Handout I

Big Idea

Different types of neurons compose the nervous tissue that forms the communication system within the body.

Introduction to Neurons

An individual's survival and reproductive success depends upon the ability to sense, respond and adapt appropriately to changes in the environment. The nervous system links sensation to response. Nerve cells (neurons) in the nervous system are the structural units principally used in transmitting information. Many different types of neurons with specialized structures enable them to conduct messages effectively from one part of the body to another.

1. Draw your mental image of a **neuron** in the space below.

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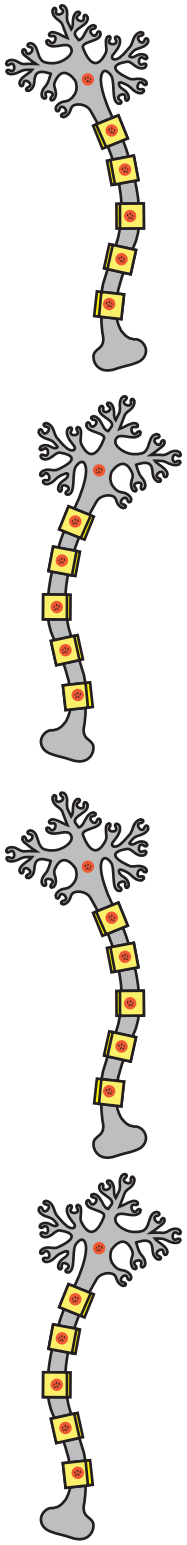


2. What are two characteristics that distinguish **nerve cells** from other cells?

_____

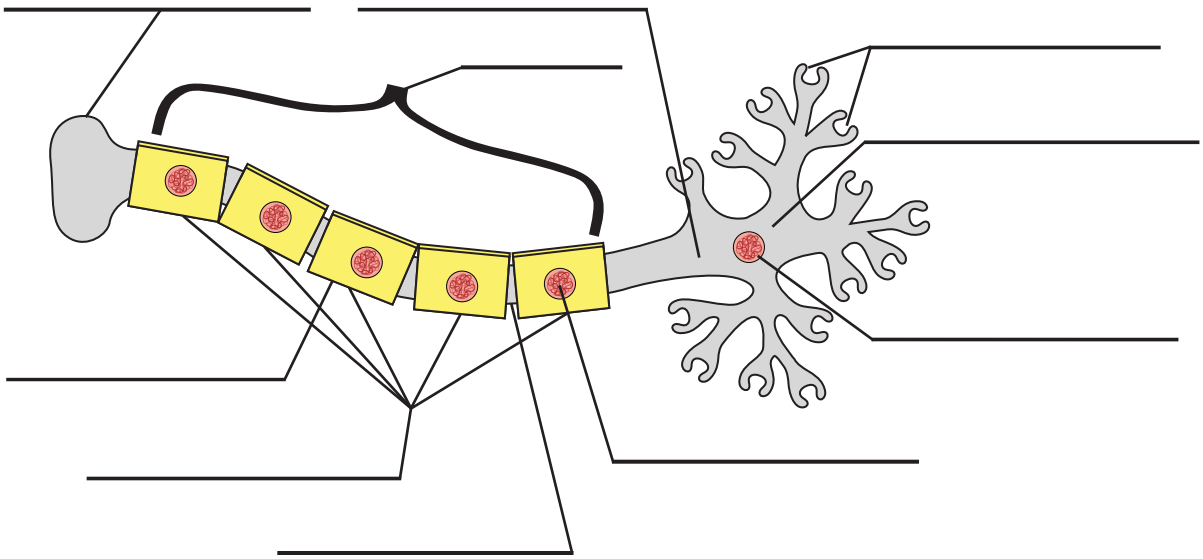
3. What is the difference between a nerve cell and a **nerve**?

_____

_____

_____

4. Label these major parts of the large neuron model: dendrites, axon, soma/cell body, nucleus, myelin sheath, Schwann cell, axon hillock, synaptic knob and node of Ranvier.



5. With an arrow, indicate the direction of the movement of information through the above nerve cell.

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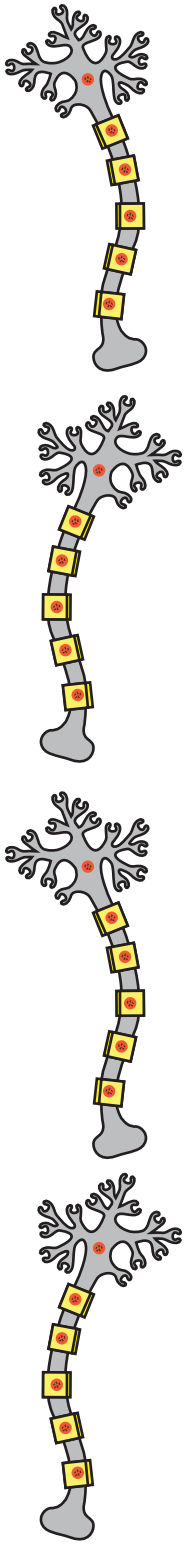
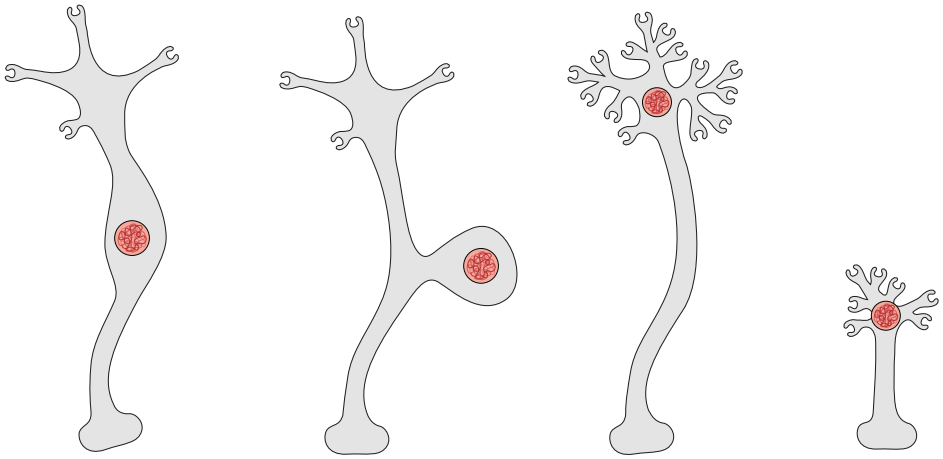


6. Sketch and identify the types of neurons modeled in the Neuron Modeling Kit© in the space below.



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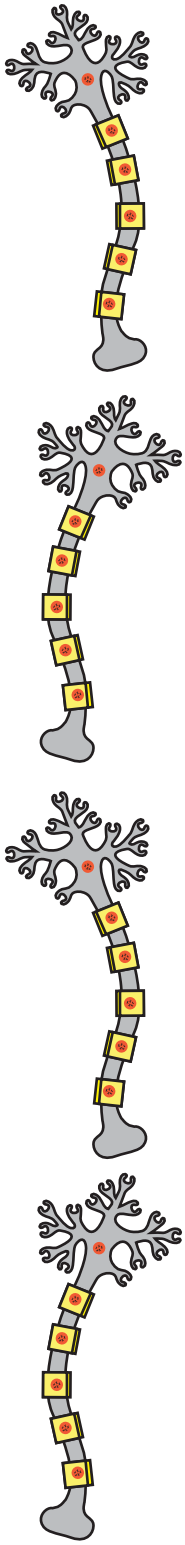

7. Where are these neurons found in the body? How do they function? Complete the chart below.

Type of Neuron Based on Structure	*Location*	*Functional Class*	*Abundance*

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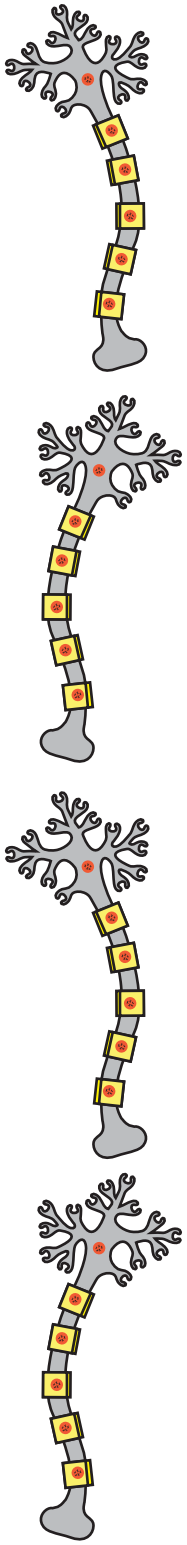


8. Identify the function of each of the following:

motor neuron - _____

_____

interneuron - _____

_____

_____

sensory neuron - _____

_____

9. What is the **myelin sheath**?

_____

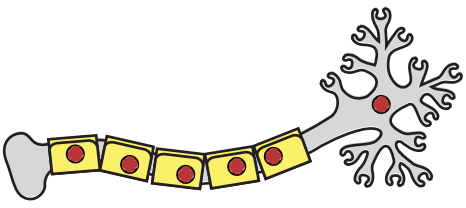
_____

10. What is the function of myelin sheath?

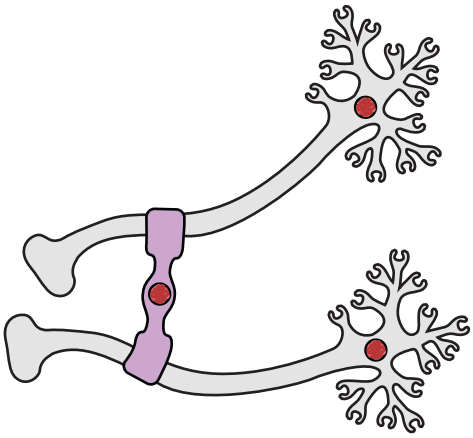
_____

_____

11. Label the **neuron**, **oligodendrocyte**, and **Schwann cell**.



Peripheral Nervous System



Central Nervous System

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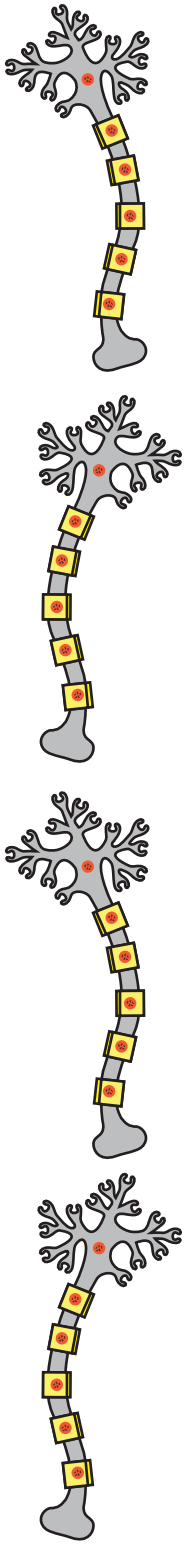


12. Is the large neuron model a part of the PNS or the CNS? How do you know?

_____

_____

13. What is a **synapse**?

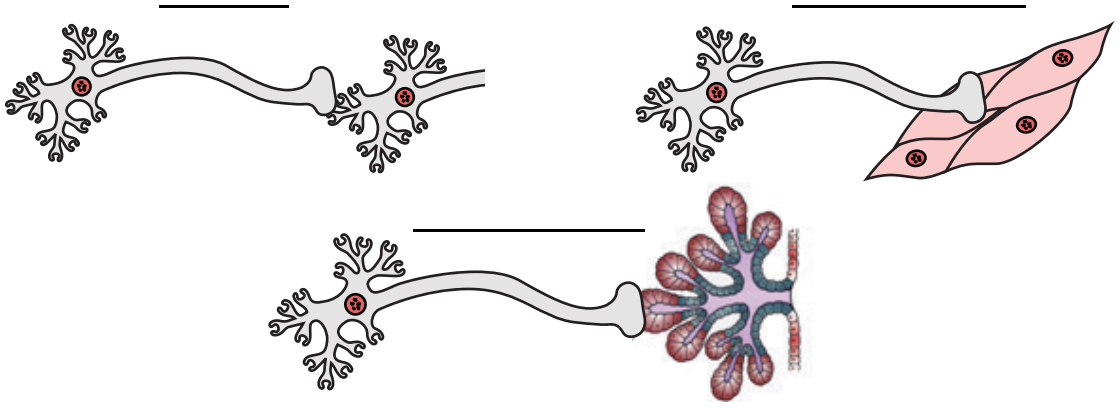
_____

_____

14. Identify where synapse junctions may occur in the body.

_____

_____



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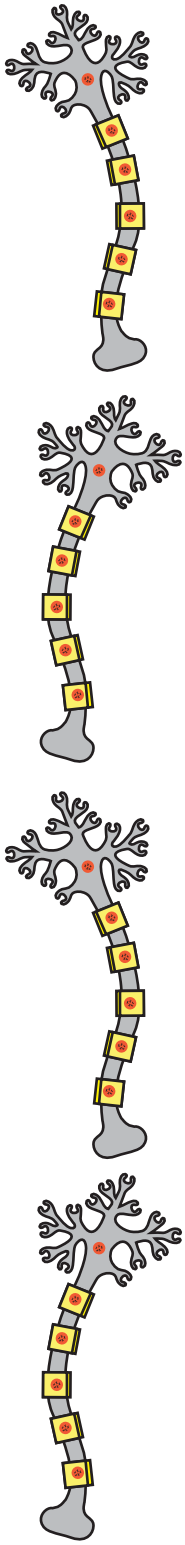

15. To illustrate the structural diversity among neurons, identify the types of synapses shown in the diagram to below (axodendritic, axoaxonic, axosomatic).

Using the neurons in the kit, model each of these synapse types.