

Build a Neuron

Objectives:

1. To understand what a neuron is and what it does
2. To understand the anatomy of a neuron in relation to function

This activity is great for ALL ages-even college students!!

Materials:

- pipe cleaners (2 full size, 1 cut into 3 for each student)
- pony beads (6/student)

Introduction:

Little kids: ask them where their brain is (I point to my head and torso areas till they shake their head yes)

Talk about legos being the building blocks for a tower and relate that to neurons being the building blocks for your brain and that neurons send messages to other parts of your brain and to and from all your body parts. Give examples: touch from body to brain, movement from brain to body.

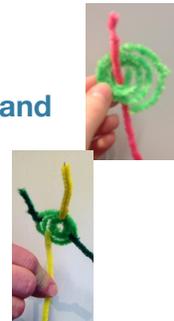
Neurons are the building blocks of the brain that send and receive messages. Neurons come in all different shapes.

Experiment:

1. First build soma by twisting a pipe cleaner into a circle



2. Then put a 2nd pipe cleaner through the circle and bend it over and twist the two strands together to make it look like a lollipop (axon)



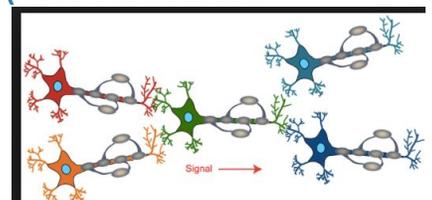
3. take 3 shorter pipe cleaners attach to cell body to make dendrites

4. add 6 beads on the axon making sure there is space between beads for the electricity to “jump” between them to send the signal super fast. (myelin sheath)



5. Twist the end of the axon to make it look like 2 feet for the terminal.

6. Make a brain by having all of the neurons “talk” to each other (have each student hold their neuron because they’ll just throw them on a table for you to do it.) messages come in through the dendrites and if its a strong enough electrical change, then the cell body sends the



Build a Neuron

message down it's axon where a neurotransmitter is released. (The neurons don't touch each other, there's a space called a synapse). Most neurons only make 1 type of neurotransmitter. There are 100s of neurotransmitters.

7. Your longest neuron is from your back to your toe. Measure it!

Parts of a neuron

- **Cell body (soma)**—where the cell's nucleus and many other organelles are found. The nucleus is the control center of the cell containing DNA which is the code or recipe to make all our body's parts.
- **Axon**—axons send information received from the cell body to the next neuron in its path. Axons can be as long as three meters and information can travel as fast as 100 meters per second (224 miles per hour).
- **Dendrite**—dendrites receive information from other neurons. The dendrites of one neuron may have between 8,000 and 150,000 contacts with other neurons.
- **Myelin sheath**—myelin is a special type of cell that wraps around axons to insulate the information that is being sent and helps deliver it faster. Just like wrapping tape around a leaky water hose would help water flow down the hose.
- **Axon terminal**—the terminal is the site at which information from one neuron is transmitted to the dendrite of another neuron (via a chemical signal).
- **Synapse**—space between the axon of one neuron sending the message (releases neurotransmitter) to the dendrite of another neuron. Neurotransmitters work like key and lock with the lock being on the receiving neuron that opens the door allowing sodium ions/electrical charge to flow into the neuron.

The human body is made up of trillions of cells. Cells of the nervous system, called nerve cells or **neurons**, are specialized to carry "messages" through an electrochemical process. The human brain has approximately 100 billion neurons. To learn how neurons carry messages, read about the [action potential](#). Neurons come in many different shapes and sizes. For communication between neurons to occur, an electrical impulse must travel down an axon to the synaptic terminal.