It's a parachute! It's a witch's broom! It's the Eiffel Tower! No, it's a NEURON!!!
If you have ever played any "string games," then this neuron model should be easy for you to make. Follow the steps on this page to make a neuron from string.

Materials:

- A loop of string or yarn (about 3 ft. in length).

Rope Neuron

This giant model of a neuron illustrates the properties of chemical transmission and the action potential. You must construct the neuron before you use it with a group of people. Cut two to three foot lengths of rope to use as dendrites. Another 10-15 foot piece of rope will be turned into the axon. The cell body and synaptic terminal of the neuron can be plastic containers. Drill holes in the plastic containers for the dendrites and axon. To secure the dendrites and axon in place, tie a knot in the ropes so they will not slip through the holes of the containers. The action potential is modeled with a pool float. Thread the pool float onto the axon before you secure the axon in place. Place small plastic balls or ping-pong balls in the synaptic terminal and your model is ready to go!

Set up the model:

1. Get volunteers to hold each of the dendrites.
2. Get one volunteer to hold the cell body and one to hold the synaptic terminal. Make sure the person holding the synaptic terminal keeps his or her hands AWAY from the place the axon attaches (more about this later).
3. Get one volunteer who will hold more molecules of neurotransmitter (more plastic balls) near the people who are dendrites.
4. Get one volunteer to hold the action potential.
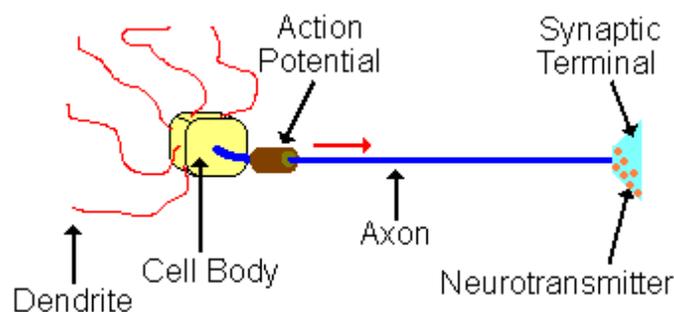
Use the model:

1. Have the person holding molecules of neurotransmitter TOSS the plastic balls to the people who are dendrites. The "dendrite people" try to catch the plastic balls. This models the release of neurotransmitters and the attachment (binding) of neurotransmitters to receptors on dendrites.

2. When three plastic balls are caught by dendrites, the person holding the action potential can throw/slide the pool float down the axon. This simulates the depolarization of the neuron above its threshold value and the generation of an action potential.
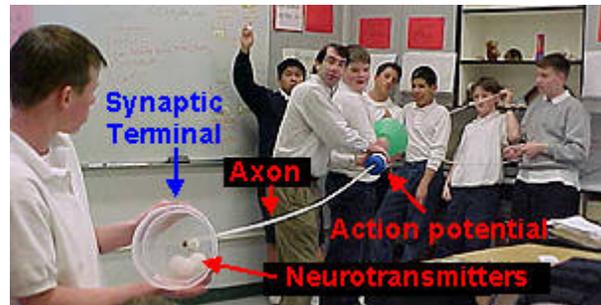
3. The action potential (pool float) should speed down the axon toward the synaptic terminal where it will slam into the container. This should cause the release of the neurotransmitters (plastic balls) that were being held there.

⚠️ CAUTION: The pool float will travel very fast! Make sure that the person holding the synaptic terminal keeps his or her fingers and hands AWAY from the pool float.

If the entire model is stretched tightly, the pool float should travel down to the terminal smoothly. This model can be used to reinforce the "ALL-OR-NONE" concept of the action potential:

- Once the action potential starts, it continues without interruption.
- The size of the action potential stays the same as it travels down the axon.

The Rope Neuron in Action
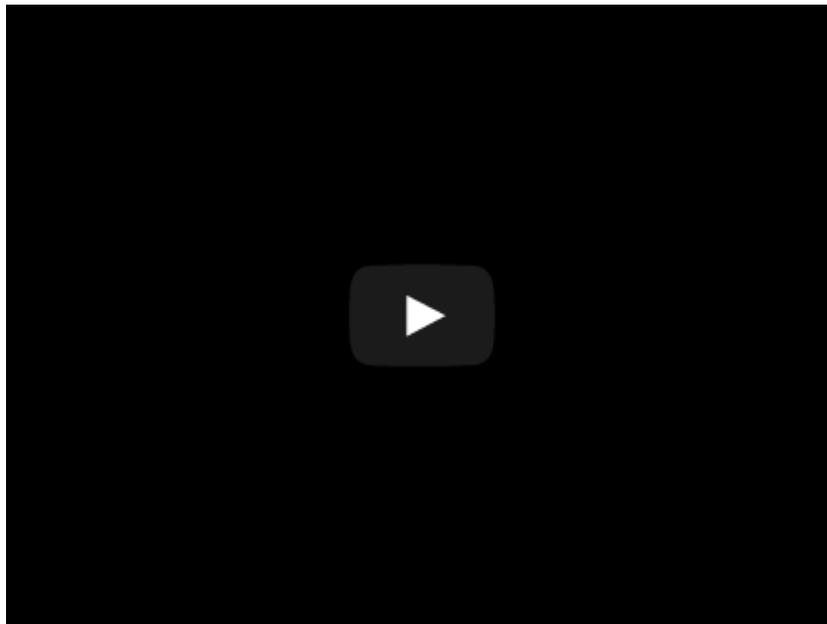
Materials:

- Rope (for dendrites and axon)
- Plastic containers (for cell body and synaptic terminal)
- Pool Float (or another object will slide along the rope; for the action potential)
- Plastic balls (for neurotransmitters)
- Volunteers!

Background information: [The Action Potential](#) | [The Synapse](#) | [Neurotransmitters](#)