



# Build a neuron

## Lesson Plan

### Learning Objectives:

1. Understand what a neuron is and what it does (focus on cellular communication)
2. Understand the anatomy of a neuron (axon, soma, dendrites... ) by demonstrating by constructing a neuron out of pipe cleaners
3. Understand the different functions of the parts of a neuron

### Background information:

Depending on the age and background of the participants you may need to explain the following concepts:

- The body is made up of cells.
- Each body part has different kinds of cells that perform different functions. The body's nervous system is made up of specialized cells called nerve cells or neurons.
- Neurons come in all kinds of shapes and sizes but they all have the same basic structure.

The following parts of the neuron are covered in this activity:

- **Cell body (soma)** – the cell body houses the nucleus, the control center of the cell. It is also the site of metabolic and biosynthetic processes.
- **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.
- **Axon terminal (bouton)** – the terminal is the site at which information from one neuron is transmitted to the dendrite of another neuron (via a chemical signal)

### Facilitating the activity:

Lead the participants in making a neuron out of the pipe cleaner parts while you identify each component of a neuron and explain its function.

**Cell body (Soma)** – Take one of the full length pipe cleaners and roll it into a ball.

**Axon** – Take another one of the full length pipe cleaners and attach it to the cell body by pushing it through the ball so that there are two halves sticking out. Take the two halves and twist them together into a single extension.

### STUDENT PRIOR KNOWLEDGE

Students should be familiar with the following concepts prior to this activity:

- The body is made up of many different types of cells.
- The brain is composed of specialized cells called neurons.

### MATERIALS

- Pipe cleaners of 4 lengths
  - (2) Full length
  - (2) 1/3 length
  - (1) 1/4 length
  - (4) 1/8 length
- Large picture of a neuron.

### TIME

- Prep: < 5 min.
- Activity: 10-15 min.

### SAFETY NOTES

- The ends of the pipe cleaners can be sharp.

### TEACHING TIPS

- Use the large cartoon image of a neuron as a visual aid.



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**Dendrites** – Take the two 1/3 length pipe cleaners and push them through the cell body on the side opposite the axon. Twist each once or twice to secure in place.

**Myelin sheath** – Wrap the four 1/8 length pipe cleaners along the length of the axon in an evenly spaced manner.

**Axon terminal/button/bouton** – Wrap the 1/4 length pipe cleaner around the end of the axon.

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