

## Hands-on Neuroscience Activity 1

### Topic and Learning Objective:

- The basic functional components of the brain: the neuron.
- Students will learn about the basic anatomy of the neuron and what each part does. They will understand how neurons move between these cells to send messages throughout the brain.

### Alignment with NGSS Grades 3-5

#### Science and Engineering Practices

##### Developing and Using Models

Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.

- Develop a model to describe phenomena. (4-PS4-2)
- Use a model to test interactions concerning the functioning of a natural system. (4-LS1-

##### Engaging in Argument from Evidence

Builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).

- Construct an argument with evidence, data, and/or a model. (4-LS1-1)

#### Disciplinary Core Ideas

##### LS1.D: Information Processing

- Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal’s brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2)

### Materials:

- 2 jars
- Marbles
- Sand
- Human Head Anatomy Model
- Rope
- Ping pong balls
- 3-4 styrofoam cups

### Detailed Description

- 5 min Introduction and short icebreaker. Gauge students understanding of the subject by asking them what they think neuroscience is. How do you think the brain works?
- 15 min Introduce the concept of the neuron. Using the jars filled with marbles and sand, illustrate just how many neurons are in the brain. Use board drawings to introduce the basic anatomy of these tiny cells in the brain.
- 25 min Separate students into groups of the main components of a neuron.
- 2-3 Dendrites
  - 1 Soma
  - 3 Axon
  - 2 Axon Terminal
  - 2-3 Dendrites of a new neuron
- Using the rope as a skeleton to shape out the neuron, students will form the neuron in the classroom and carry out their roles as the neuron receives, carries, and delivers a message.
- Ping pong balls will be used as the message (neurotransmitter) and the cups will be used by the dendrites to catch the message. The activity may be shorter, but I want students to do this a couple times, each time, they can master their 'role' in the cell and help get the message through faster each time.
- 15 min A quick clean up and conclusion of the lesson
- Make sure that students understand what each role they played in passing the message along. These roles are similar to those in the tiny cells in your brain. The neurotransmitters (ping pong balls) aren't always received by the next neuron (can't be caught in the cup) and that's okay! Your brain uses a lot of them to make sure the message gets through. Remember, that these cells are what send messages to your brain and help you think, act, and feel things throughout the day.

### Learning Skills:

- Observation, application and practice, critical thinking, and imagination! You can't physically see these cells working, but you can imagine how they function by doing it yourself!

### Safety Precautions

- none