



## Classroom Teacher Preparation

### Anatomy/Physiology 19: Neurons

Please use the following to prepare for the next SfS lesson.

#### Description:

This lesson focuses on the human brain and its functional units, the neurons. Neurons (nerve cells) are specialized cells designed to transmit information to other neurons. The activity in this lesson allows students to explore the structure and function of neurons through the construction of models. Students will model nerve impulses and discuss how neurons send signals between the sensory and motor systems. This module works best if followed up with *AP20: Experimenting with Our Brains*.

#### Lesson Objectives – SWBAT (“Students Will Be Able To...”):

6<sup>th</sup>-8<sup>th</sup>

- Explain how neurons communicate to each other and how messages are transmitted
- Use neuron models to conduct nerve impulses with a chain of neurons

#### Disciplinary Core Idea (DCI)

LS1 From Molecules to Organisms: Structures and Processes - LS1.D Information Processing

- (6<sup>th</sup>-8<sup>th</sup>) Each sense receptor responds to different inputs, transmitting them as signals that travel along nerve cells to the brain; the signals are then processed in the brain, resulting in immediate behavior or memories.

#### Science & Engineering Practice (SEP)

Developing and Using Models

- (6<sup>th</sup>-8<sup>th</sup>) Develop and/or use a model to generate data to test ideas about phenomena in natural or designed systems, including those representing inputs and outputs, and those at unobservable scales.

#### Crosscutting Concept (CCC)

Cause and Effect

- (6<sup>th</sup>-8<sup>th</sup>) Cause and effect relationships may be used to predict phenomena in natural or designed systems.

#### Preparation:

Students should have a basic knowledge of cells and their functions. This lesson serves as an introduction to neurons, the brain, and the nervous system.

#### Room Set Up for Activities:

Students will work in groups of 4-5 to model nerve impulses with giant neurons. Each group will need approximately 10 feet of space for their neuron. Tables or desks may need to be moved to accommodate the activity.



## Safety:

There are no safety precautions for this lesson, but students might need to be reminded to be responsible with the ping pong balls.

## Related Modules:

This lesson may be taught as part of a sequence or group of related modules on the **brain and nervous system**. Modules include:

*Anatomy/Physiology 20: Experimenting with our Brains* – This activity demonstrates how the brain learns to adapt to an altered situation by doing an experiment with prism goggles and beanbags.

*Anatomy/Physiology 18: The Mammalian Brain* – Students examine preserved sheep brains to learn about the different structures of the brain, including cerebrum, cerebellum, and brainstem. Lobes of the brain and their functions are introduced.

For other module sequences and groups, look here: [www.sciencefromscientists.org/sequences](http://www.sciencefromscientists.org/sequences)

## Standards Covered:

Please click the following link to our website to review the standards covered by this lesson, listed by state: [www.sciencefromscientists.org/standards/](http://www.sciencefromscientists.org/standards/)

Lessons are matched to both national NGSS and local state standards.

## After Our Visit:

*Extend this lesson by conducting a series of tests to determine whether the subject is right-brain dominant or left-brain dominant.*

Access this Extension activity by visiting the Classroom Post found on our website at [sciencefromscientists.org/cohorts](http://sciencefromscientists.org/cohorts). Use the name of your school/cohort and password to log in.

To help Evaluate, check out our Open Response questions online at [sciencefromscientists.org/open-response-questions](http://sciencefromscientists.org/open-response-questions). They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

## Additional Resources:

- Zooming into the Human Brain (3:45): A visually stunning tour of the human brain, from anatomy to cells to genes and back by the Allen Institute for Brain Science: [https://www.youtube.com/watch?v=Zj3RxtJ\\_Ljc](https://www.youtube.com/watch?v=Zj3RxtJ_Ljc)
- Nervous System – How the Body Works (1:22): <https://www.youtube.com/watch?v=RIUPCNLSJIY>
- How a Neuron fires (4:12): <https://www.youtube.com/watch?v=C4Gt322-XxI>