Classroom Teacher Preparation

Anatomy/Physiology 19: What's in My Head?

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

Description:

This lesson is an introduction to the human nervous system (NS), and focuses on the human brain and its functional units, the neurons. The neuron is the basic working unit of the NS: it is a specialized cell designed to transmit information to other nerve cells. The activity in this lesson allows younger students to explore the structure and function of the brain and neurons through the construction of models. Older (6^{th}-8^{th} grade) students will construct models, as well as learn about nerve cell communication.

Lesson Objectives – SWBAT ("Students Will Be Able To…"):

3^{rd}-8^{th}

- Describe the parts of the Nervous System and understand how our behavior is controlled, mainly by our brain
- Understand that the brain is organized in different parts and that each part has a different function
- Understand that the brain is composed of neurons, which are the basic functional units of the Nervous System and that their job is to transmit information

6^{th}-8^{th}

- Describe the functions of each part of the brain (cerebellum, brain stem, and the cerebrum/cortex and its lobes)
- Understand how neurons communicate (synapse, nerve impulse, action potential)

Disciplinary Core Idea (DCI)

LS1 From Molecules to Organisms: Structures and Processes – LS1.A Structure and Function

- (3^{rd}-5^{th}) Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.
- (6^{th}-8^{th}) All living things are made up of cells. In organisms, cells work together to form tissues and organs that are specialized for particular body functions.

Science & Engineering Practice (SEP)

Developing and Using Models

Preparation:

Please review cells as the basic building blocks of tissues in organisms. Neurons will be introduced as a special kind of cell in the NS that transmits information. Consider having our lesson on cells (*AP01: Cell City*) taught before this lesson if your students need an introduction or in-depth review about the role of cells in the human body.

Optional: Introduce the nervous system (NS) and its role in keeping the body functional (voluntary and involuntary bodily functions are all controlled by the NS), with our brains as the command center for the NS. Also introduce the concept of the brain as an integration organ that receives and sends information through the nerves (input/output).

It is recommended that this lesson be paired with *AP20: Learning & Memory*.

Room Set Up for Activities:

Younger (4th & 5th) grade students will work in pairs, modeling with clay. Older (6th-8th) grade students will first work in pairs modeling with clay, and then reorganize into groups of 5-6 students for the second activity. Table space is fine for either scenario.

Safety:

The 6th-8th grade students will be tossing ping pong balls, so students should be instructed to toss them gently.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Function & Dissection Pairings**. Other modules in this sequence include:

Anatomy/Physiology 13: Structure of the Human Eye & Anatomy/Physiology 14: Eye Dissection - Students will learn about the physiology and function of the human eye, and dissect a sheep eye.

Anatomy/Physiology 15: Heart Dissection & Anatomy/Physiology 16: Heart Health - Students will learn about the essential functions of the cardiovascular system and dissect a sheep heart.

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. This is *not* a dissection.

For other module sequences and groups, look here: 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: 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. 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. They are freely available for all of our lessons for current teachers. Use the password supplied by your instructor to log in.

Additional Resources:

For teachers:

- Brain Facts Book: a primer on the brain and nervous system, published by the Society for Neuroscience Download the full book for free here: http://www.brainfacts.org/about-neuroscience/brain-facts-book/
- Zooming into the Human Brain video (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

For showing students:

Mocomi Kids, “Nervous System – How the Body Works” (1:22): https://www.youtube.com/watch?v=RlUPCNLSJIY
“How the brain works” (1:36): https://www.youtube.com/watch?v=XSzsI5aGcK4
“Areas of the brain” (3:06): https://www.youtube.com/watch?v=5_vT_mnKomY