

The Brain, the 4 lobes, and neurons

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Course Name	Elementary School Outreach		Day/Date	
Objective(s)	Students will be able to identify the 4 lobes of the brain on the sheep brain specimens. Students will be able to explain the function of each lobe of the brain. Students will be able to explain the parts and functions associated with a neuron. Students will be able to explain what can happen if the brain and neurons experience damage.			
Materials, Texts & Reminders	Building a Neuron Activity: a glue stick, 3 Q-tips, 2 sheets of white paper, recycled toilet paper or paper towel roll, a pair of scissors, 4 crayons: orange, red, green, and blue	Key Points	Each structure in the brain has a different, unique function. Each lobe of the brain is associated with a particular function. The brain is made up of many neurons and they have an important effect on our daily lives.	
Big Questions	What are the 4 lobes of the brain? What is the function of each lobe of the brain? What are the individual parts of a neuron and their functions?			
Assessment	Interactive assessment- quiz like structure			

Do First	Warm-up: Story of Phineas Gage to demonstrate how damage to the lobes can cause major changes in a person's life and the division of labor in the brain. (5 minutes)
Lesson Execution	Introduction to the Brain (Brain Anatomy Basics, the 4 Lobes of the Brain): (10 minutes) What is the brain and its importance? The presenter will ask the following 3 questions to the students in order to answer this: What can you describe about the brain? What do you think the brain does? Do you have any cool facts about the brain? The 4 lobes of the brain and their functions: Frontal – reasoning, planning, parts of speech, movements, emotion, and problem solving; Parietal – movement, orientation, recognition and perception of stimuli; Occipital – visual processing; Temporal – auditory processing. This will be related back to the Phineas Gage story. Crossed Arms Activity: students will complete a quick activity where they will cross arms and be asked to lift a certain finger. Majority won't be able to do so and thus will show that the brain can be tricked by unfamiliar positions. We will discuss the lobes being used in the spatial awareness of this activity. Optical Illusions: We will show two optical illusions to demonstrate how our brain likes to fill in missing pieces to a picture as well as the idea of cross communication. We will discuss which lobe is being used. What is the brain made of other than the lobes? Neurons What is the neuron? Long cells in the brain that can communicate with each other. The branches receive and send out information in specific directions. Scientists believe that there are over 100 billion neurons in the brain. The parts of a neuron: The stroma (cell body) which has dendrites and a nucleus. An axon that has myelin sheath on it in chunks. Synaptic terminals at the end. Messages flow from the start on the left (cell body) and ends on the right (the synaptic terminals). Interactive Building of a Neuron: (35 minutes) The classroom will be broken into smaller groups and the Science Ambassadors will be making a neuron with the students. This activity will be focused on the Dendrites, Myelin Sheath, and the Synaptic terminals. The Science Ambassadors will go through the following steps: 1. On one piece of paper, trace your left hand with orange and draw a circle in the center with blue and fill it in. 2. Color the rest of this hand in with orange. 3. On this same sheet of paper, trace out just the fingers of your right hand in red and color it in. 4. Cut these out hands out and them onto the tube 5. On a new second sheet of paper cut 2-3 strips of paper out and color them green. If they are using the large tube they will need 3 and the smaller tube only needs 2. 6. Glue these onto the tube

	7. Finally, put glue on the fuzzy tips of the Q-tips and glue them onto the fingers of the orange hand as you please. The pattern that they do this doesn't matter since each neuron has a different branching pattern. After the neuron is made the Science Ambassador will explain to the students the following about color and material assignment: The toilet paper/paper towel roll represents the axon since it's rounded and thick like an axon. The green paper around the tube in chunks represents the myelin sheath. Green means "go" on a stoplight and thus represents the myelin sheath because this speeds up the time that it takes to pass along a message. The orange hand is the soma/cell body and the blue in the center of the hand is the nucleus. The fingers and Q-tips on them are the dendrites and mimic the branching patterns they have. Q-tips have the ball on the end which connects to the fingers on the axon terminal to gain the message and pass it along. The red fingers are the axon terminals because red means "stop" on a stoplight/ stop sign and thus represents the terminals/ end of the message being carried. Class Review: (5 minutes) We will gather back together as a class for this review. Why is the neuron so important? Neurons build the brain entirely and need to be taken care of. Damages to large amounts of Neurons can lead to severe mental illnesses. The presenter will remove certain parts of the neuron model they created to show the effects of neuron damage to the brain's function. The myelin sheath parts will be removed and the repercussion of Alzheimer's disease will be discussed.
Closing and Assessment	