

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

Description:

Students examine and ask questions about preserved sheep brains. Students identify which questions can be answered by observation alone, and learn about the major substructures of the brain.

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

3rd-8th

- Describe the basic structural organization of the brain & the functions of the cerebrum, cerebellum, and brainstem
- Make comparisons between sheep brains and human brains

Disciplinary Core Idea (DCI)

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

- (3rd-5th) Organisms have both internal and external macroscopic structures that allow for growth, survival, behavior, and reproduction.
- (6th-8th) 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)

Asking Questions

- (3rd-5th) Ask questions that can be investigated and predict reasonable outcomes based on patterns such as cause and effect relationships.
- (6th-8th) Ask questions that arise from careful observation of phenomena, models, or unexpected results, to clarify and/or seek additional information.

Crosscutting Concept (CCC)

Structure and Function

- (3rd-5th) Substructures have shapes and parts that serve functions.
- (6th-8th) Complex and microscopic structures and systems can be visualized, modeled, and used to describe how their function depends on the shapes, composition, and relationships among its parts; therefore, complex natural and designed structures/systems can be analyzed to determine how they function.

Preparation:

This lesson is a general introduction to brain anatomy. Students do not need background knowledge of the subject matter.

Room Set Up for Activities:

Students will work in groups of 3 or 4. There are enough specimens for 8 groups. Clear table space is necessary. Students should remove all personal materials, food, and water from their desks before the start of the lesson.



Safety:

Protective eyewear must be worn at all times during this activity and gloves are required. We use powder-free latex gloves by default, however a box of one-size-fits all polyethylene (non-latex) gloves will also be available, and substitute gloves of another material are available for the whole class upon special request ahead of time. Please inform the instructor of a latex allergy before the day of the lesson. Hands and tables should be washed following the lesson.

Sheep brains, purchased from Carolina Biologicals are preserved in Carolina's Perfect Solution. Carolina's Perfect Solution®, a combination tissue fixative and preservative, is an alternative to formaldehyde-preserved specimens. The formula is safe and nontoxic but does have a distinct odor. Open class windows during the activity if weather permits.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on the **Nervous System**. Modules include:

Anatomy/Physiology 19: What's in My Head? – An introduction to the human nervous system that focuses on the human brain and its functional units, the neurons. The activity in this lesson allows students to explore the structure and function of the brain and neurons through the construction of models.

Anatomy/Physiology 20: Experimenting with our Brains – Demonstrates how the brain learns to adapt to a new situation via a simple experiment involving prism goggles and throwing beanbags.

Anatomy/Physiology 13: Structure of the Human Eye - This lesson's multiple short activities will walk students through their eyes from front to back, experimenting with and experiencing how different parts affect image formation.

Anatomy/Physiology 14: Eye Dissection – Students explore the anatomy of a preserved sheep eye with a review of mammalian eye anatomy and the basic mechanics of vision.

For other module sequences and groups, look here: <u>www.sciencefromscientists.org/sequences</u>

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/

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

After Our Visit:

Extend this lesson by creating a paper brain hat and exploring the functions of the various brain regions. http://www.ellenjmchenry.com/homeschool-freedownloads/lifesciences-games/documents/Brainhat.pdf

Access this Extension activity by visiting the Classroom Post found on our website at <u>sciencefromscientists.org/cohorts</u>. Use the name of your school/cohort and password to log in.

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

Additional Resources:

- A New Map of the Human Brain SciShow (watch until 1:55): <u>https://www.youtube.com/watch?v=ml9H1wAG_U4</u>
- Body Songs: "Brain, Brain, Brain" StoryBots (1:14): <u>https://www.youtube.com/watch?v=Nnl7DLSNFV8</u>
- Are People Really Right Brained or Left Brained? (advanced material) SciShow (8:25): <u>https://www.youtube.com/watch?v=UYWBLX7aexl</u>
- Neuroscience for Kids Website with information and games: <u>http://faculty.washington.edu/chudler/chgames.html</u>
- Do I Only Use 10% of My Brain? SciShow (4:03): https://www.youtube.com/watch?v=YxIS3XxfFS0
- Human Brains Compared to Other Animals (1:34): <u>https://www.youtube.com/watch?v=iCXSZQSWwdM</u>

