



Classroom Teacher Preparation

Anatomy/Physiology 13: How the Eye Works

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

Description:

This lesson's multiple short activities will walk students through their eyes from front to back. Students observe the contraction of the iris and focusing of the lens, as well as the features of the retina by experimenting with peripheral vision and finding their blind spot. Longer classes will also be able to explore afterimages.

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

3rd-8th

- Explain how structures of the eye contribute to vision
- Distinguish between the cone and rod cells in the retina

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)

Constructing Explanations and Designing Solutions

- (3rd-5th) Use evidence (e.g. measurements, observations, patterns) to construct or support an explanation or design a solution to a problem.
- (6th-8th) Apply scientific ideas, principles, and/or evidence to construct, revise and/or use an explanation for real-world phenomena, examples, or events.

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 intended be taught *after AP14: Eye Dissection* to enhance students' appreciation of the structures they have observed in the dissection of the sheep eye by allowing them to experiment with those structures in their own eyes.



Room Set Up for Activities:

Students will work in partners or individually for these activities. A darkened room is needed for the first activity, and a well-lit room for the later activities.

Safety:

Some activities involve students placing objects near their eyes. The objects are not sharp or hazardous, but due care should be exercised.

Related Modules:

This lesson may be taught as part of a sequence or group of related modules on **Dissection and Function**. Modules include:

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.

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.

Physics 13: Light Reflection, Transmission, and Absorption – This lesson can be an introduction to light. Students work in small groups through three activities demonstrating how light interacts with objects and how light is absorbed or transmitted by filters.

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 experiencing the benefits of binocular vision.

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:

- Several of the activities in this lesson are modifications of those found on the Exploratorium Teacher Institute website (and licensed under Creative Commons). Their full menu of activities on visual perception is found here: <http://www.exploratorium.edu/snacks/subject/light-color-seeing>
- The images for blind spot activity are from Dr. Eric Chudler's website, used with permission. Find these images and other cool visual illusions here: <https://faculty.washington.edu/chudler/chvision.html#stare>
- How the Eye Works Animation (3:24): <https://www.youtube.com/watch?v=YcedXDN6a88>