Classroom Teacher Preparationz

Anatomy/Physiology 13: Structure of the Human Eye

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, experimenting with and experiencing how different parts affect image formation. Students observe the contraction of the iris, the minimum focal length of the lens, the distribution of rod and cone cells in the retina and the effect of this distribution on peripheral vision, the blind spot resulting from the existence of the optic disk, and optionally, the function of the cone cells.

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

3rd-8th

- Recognize that the iris is a muscle that controls the amount of light entering the eye
- Understand that the lens of the eye is responsible for focusing light on the retina to form a clear image
- Explain that the retina consists of rod and cone cells, which perceive light and send images to the brain. The cone cells are responsible for color vision and sharpest vision, and are clustered at the fovea

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 and Defining Problems

Preparation:

This is an introductory lesson, and no special preparation is required. Additionally, this lesson, though fun as a stand-alone, is designed to coordinate with the **AP14 Eye Dissection** module. It is intended to enhance students' appreciation of the structures they will observe in the dissection of the sheep eye, by allowing them to first observe the functions of 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 own eyes or the eyes of their partner. 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**. It can also be taught in relation to modules in other topics:

Anatomy/Physiology 14: Eye Dissection – This module is specifically designed to pair with the eye dissection activity, to enhance students' appreciation for the structure of the eye that they will observe directly during the dissection of a sheep eye.

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
- This activity page discusses some of the interesting adaptations in animal eyes, especially those of nocturnal animals: http://www.pbs.org/wgbh/nova/leopards/nightvision.html
- This video discusses the evolution of color vision in humans: http://mass.pbslearningmedia.org/resource/f1b9508d-afbb-443f-a837-be42b806b73d/finding-the-origins-of-color-vision-your-inner-fish/