

Bay Area Scientists in Schools Presentation Plan

Lesson Name Eye didn't know that

Presenter(s) Dr. Interns UC Berkeley Chapter

Grade Level 3rd Grade

California Standards Connection(s): 3rd Grade Life & Physical Science

3-PS-2. Light has a source and travels in a direction. As a basis for understanding this concept:

d. Students know an object is seen when light traveling from the object enters the eye.

3-LS-3. Adaptations in physical structure or behavior may improve an organism's chance for survival. As a basis for understanding this concept:

a. Students know plants and animals have structures that serve different functions in growth, survival, and reproduction.

Next Generation Science Standards:

4-LS1-1. Construct an argument that plants and animals have internal and external structures that function to support survival, growth, behavior, and reproduction.

4-LS1-2. Use a model to describe that animals receive different types of information through their senses, process the information in their brain, and respond to the information in different ways.

Science & Engineering Practices	Disciplinary Core Ideas	Crosscutting Concepts
<p>Developing and Using Models Modeling in 3–5 builds on K–2 experiences and progresses to building and revising simple models and using models to represent events and design solutions.</p> <ul style="list-style-type: none"> Use a model to test interactions concerning the functioning of a natural system. (4-LS1-2) <p>Engaging in argument from evidence in 3–5 builds on K–2 experiences and progresses to critiquing the scientific explanations or solutions proposed by peers by citing relevant evidence about the natural and designed world(s).</p> <ul style="list-style-type: none"> Construct an argument with evidence, data, and/or a model. (4-LS1-1) 	<p>PS4.B: Electromagnetic Radiation</p> <ul style="list-style-type: none"> An object can be seen when light reflected from its surface enters the eyes. (4-PS4-2) <p>LS1.A: Structure and Function</p> <ul style="list-style-type: none"> Plants and animals have both internal and external structures that serve various functions in growth, survival, behavior, and reproduction. (4-LS1-1) <p>LS1.D: Information Processing</p> <ul style="list-style-type: none"> Different sense receptors are specialized for particular kinds of information, which may be then processed by the animal's brain. Animals are able to use their perceptions and memories to guide their actions. (4-LS1-2) 	<p>Cause and Effect</p> <ul style="list-style-type: none"> Cause and effect relationships are routinely identified. (4-PS4-2) <p>Systems and System Models</p> <ul style="list-style-type: none"> A system can be described in terms of its components and their interactions. (4-LS1-1), (LS1-2)

FOSS Connections:

Grade 4-6 Module: Living Systems



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Teaser:

We use our eyes to see the world all the time. But have you thought about what eyes look like? In this lesson, we will learn about our eyes. We will learn about different part of the eye and watch dissection of a cow eye. Also, we will look at various optic illusions and talk about our experiences. The lesson will end with some advice regarding eye health.

Objective: This lesson is to familiarize students with the basic eye anatomy and health through various hands-on activities. Students will recognize that eyes are made of many different parts. They will have the opportunity to think about eye health and mysterious things that our eyes do.

Vocabulary/Definitions:

- Retina: a layer at the back of the eye
- Iris: a pigmented circular structure in the eye; controls the amount of light that goes in the eye
- Pupil: a hole located in the center of the iris
- Lens: a transparent structure behind the iris; focus the light
- Cornea: a clear front part of the eye that covers the iris and pupil
- Optic nerve: sends what we see to the brain

Materials:

- 3 Cow eye for dissection
- Dissection tool kit
- Wet wipes
- Gloves
- Coloring sheets
- Visual illusion printouts

What should students have ready (pencils, paper, scissors)?

- Colored pencils

Classroom Set-up:

- Set up three stations with materials for demo when the introduction is done
- A jug/beaker/cup of water to make the eye moist

Classroom Visit

1. Personal Introduction: _____2_____ Minutes

Introduce each member. We all go to UC Berkeley and we are interested in studying the human body and health. Today, we are going to talk about our eyes. [Write on the board]

Topic Introduction: _____10_____ Minutes

What questions will you ask to learn from students? Big Idea(s), vocabulary, assessing prior knowledge...



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Your eyes are very important because you see with your eyes. Your eyes allow you to easily recognize your friends' faces or to check if your food has a bug in it or not. Can anyone tell me what else you do with your eyes? [Pick out volunteers] Yes, your eyes are important for all of these you mentioned.

Your eyes are made of many different parts. When you see your face, you only see a small part of your eyes, but your eyes actually look like this in your head. [Point to a model or draw it on the board]. The eye is actually a ball-shaped structure with many different parts. This is your eyeball [point to the eyeball]. This part of your eye is embedded in your head, so normally you only see this part of your eye [point to the outer part of the eye].

Stare at your friend's eyes for a moment. What color are they? [Take enough volunteers to let kids notice that people have different colored eyes]. Yes, we all have different eye colors. I personally have _____ eyes. This colored part of your eye is called the iris. When you look at your friend's eyes, did you notice the black center that is surrounded by this iris? We all have those. They are actually holes in our eyes through which the light goes. This black hole is called a pupil. Iris and pupil work together to control how much light goes into the back of your eye. We are going to do an activity to see how this works. Look toward your friend and go like this, in turns. [Cover your eyes with your hand for a while and uncover it]. Watch what happened to your friend's iris and pupil. [Pause for the demo]. Did you all see how the size of the pupil changes? When it's dark, your pupil grows bigger to let more light into your eye. And when it's really bright, your pupil gets smaller to prevent too much light from going into your eye.

Your pupil and iris is covered with this clear layer called cornea. [Point to the appropriate structure] And behind your pupil, there's a structure called lens. [Point to the appropriate structure]. This lens works just like a camera lens and focuses the light. This light, then, go travel into your eye ball and hit this layer called retina. Retina is the back of your eyeball. [Point to the appropriate structure]. Once the light hits the retina, it travels up the optic nerve [point to the appropriate structure] and goes to the brain. When the information reaches the brain, we finally see the world!

Now that we know the basics of the eye, we are going to split up to 3 groups. At one station, we will talk about these regions we learns and color in a sheet. At the second station, you will get to see a real cow eyeball. We will dissect it for you to see all the structures we learn here in a real eye. And at the final station, we will look at how our eyes are tricked by illusions.

[Ask for the teacher's help to group students]

Learning Experience(s): _____ **30** _____ **Minutes**
(10 minutes per station)

- Station 1: Cow Eye Dissection / Ask students to name structures as we dissect
- Station 2: Coloring sheet



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Review structures of the eye. For each structure, give students enough time to color. When you get to cornea, explain this:

Your eyes are very fragile. Dusts get into our eyes all the time when it's windy outside. When you have something in your eyes, it is important not to rub your eyes. Because this part of your eye that we learn, [point to the cornea], does anyone remember what this is called? [Pick a volunteer]. When you rub your eye with dust in your eye, your cornea gets scratched. And bad germs in your hand can get into your eyes. What you can do instead is to blink the dust out. Once something gets on your cornea, your eyes will make tear to wash the dust away.

- Station 3: Optic illusion:

Go through the visual illusion printouts and ask students about their experiences.

2. Wrap-up: Sharing Experiences _____ **5-10** _____ **Minutes**

We learned about what eyes look like and what they do. Do you all agree that your eyes are super cool? Tell me one thing that you learned today [Pick volunteers]

3. Connections & Close:

_____ **5** _____ **Minutes**

Does anyone have any questions?

**Total 50 – 60
Minutes**

Follow-up – After Presentation

Suggest students write a letter explaining "How we learned about eyes?"

List or attach examples of activities, websites, connections for additional learning.

- Cow eye dissection: http://www.exploratorium.edu/learning_studio/cow_eye/

Attach worksheets, hand-outs, visuals used in classroom presentation.

- *Visual illusions*
 - Hermann Grid: http://psylux.psych.tu-dresden.de/i1/kaw/diverses%20Material/www.illusionworks.com/html/hermann_grid.html
 - Spinning wheel: <http://richrock.com/illusion.html>
 - Parallel illusion: <http://sharpbrains.com/blog/2010/10/27/test-your-brain-with-these-top-10-visual-illusions/>
 - Cat and mouse illusion: <http://www.anopticalillusion.com/2013/10/cat-and-mouse-optical-illusion/>
 - Who's holding who illusion: <http://www.anopticalillusion.com/2013/11/who-is-holding-who/>
 - Archimboldo's "Giuseppe Summer": http://commons.wikimedia.org/wiki/File:Arcimboldo,_Giuseppe_Summer.jpg
 - Hybrid image: <http://en.globalquiz.org/question/whose-face-has-been-combined-with-albert-einstein/>



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Name: _____

Date: _____

EYE coloring sheet:

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