

# **Community in the Classroom Presentation Plan**

Lesson Name Light, Colors, and Vision

Presenter(s) Mark Steedman

Grade Level 3 Standards Connection(s) Physical Science: Vision: We see objects when light traveling from an object enters our eye.

## **Abstract:**

*Your opportunity to tell teachers and kids what's going to be fun and interesting about your visit!*

The eye is a complicated and fascinating structure directly wired to the brain. It is through constant communication between the eye and the brain that we are able to see things and respond to what we see. Today we'll talk about the part of the eye known as the retina. A demonstration using a camera flash will be used to show the limitations of our eyes. Students will make optical spinners and trick their eyes into combining different images into a single image. If time permits students will also be allowed to make a flipbook.

## **Vocabulary/Definitions:**

retina: a layer of the back of the eye that senses light and transmits information to the brain

rod: a light-sensitive cell in the retina that is responsible for night vision

cone: a light-sensitive cell in the retina that is responsible for color vision

colorblind: unable to distinguish certain colors due to problems with the cone cells

## **Materials:**

*What you'll bring with you*

Index card paper some with patterns such as bird/birdcage, fish/aquarium, and some blank

Index card paper for flipbooks

Straws

Stapler

Scotch Tape

Crayons

Camera

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

Crayons, markers, color pencils, etc.

## **Classroom Set-up:**

*Student grouping, Power/Water, A/V, Light/Dark, set-up/clean-up time needed*

Table or work area in front of room (small is fine)

## **Classroom Visit**

### **1. Personal Introduction: 5 Minutes**

*Who are you? What do you want to share with students and why? How will you connect this with students' interests?*

Today we're going to learn about the eye and how it senses the information surrounding us. I am a PhD student at UCSF studying different ways to treat eye diseases. As people get older they are more susceptible to diseases, especially those that affect the retina, a small layer in the back of the eye that is responsible for sensing light and transmitting that information to the brain. In many of these diseases the retina degenerates, or slowly breaks down and stops working correctly. I'm looking at different ways to replace and re-grow that layer of the eye. I'm interested in this because it combines many of the things I've learned as a student so far.



## Topic Introduction:

5-10 Minutes

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

Students will learn about the retina and its main components, the rods and cones. These light-sensitive cells are known as photoreceptors and are responsible for sensing light from the outside world. This information is then sent to the brain where it is processed. The brain then tells our muscles what to do in response to what our eyes have seen. Rods are concentrated around the outer part of the retina and are responsible for night vision. Cones are concentrated at the center of the retina and are responsible for color vision. Most people have three different types of cones, those responsible for red, green, and blue. Use example of a baseball player tracking a baseball leaving a pitcher's hand. The rods and cones detect the ball as it moves toward the batter. As it gets closer, the batter reacts, and swings the bat.

## 2. Learning Experience(s):

30-40 Minutes

*Demonstrations, hands-on activities, images, games, discussion, writing, measuring... What will you do, what will kids do? Describe in order, including instructions to kids.*

Demonstration: Mark will use a camera flash to demonstrate how the rods and cones work. Light "excites" the photoreceptors, but the number of photoreceptors that are excited is proportional to the intensity of the light. If a stimulus is bright enough, too many of the photoreceptors are excited and they can't recover fast enough. Students exposed to a bright light will still see the flash in their central vision for several seconds after the flash. Can anyone guess why this occurs? It's similar to asking someone to jump in the air. The person cannot jump again until he or she has landed and recovered from the first jump.

Activity: The eye reacts similarly when two stimuli are given to the eye at nearly the same time. Students will color in the provided templates or draw their own images on the provided pieces of card paper. They will be shown an example of a picture of a bird on one piece of paper, and a birdcage on the other. When these two images are laid back to back and spun such that both images are seen within fractions of a second of each other the two images will appear merged. Students will be given a straw and Scotch tape to secure the two pieces of card paper together and spin the straw using their hands.

Activity 2 (optional): If students finish early they will be given more card paper to create flipbooks. The students will be instructed to draw similar pictures on a series of pieces of card paper such that when stapled together and flipped it looks like an animation. Students will be encouraged to draw events such as a sun setting, or a person running, etc.

## 3. Wrap-up: Sharing Experiences and Building Connections

5-10 Minutes

*Putting the pieces together – how will students share learning, interpret experience, build vocabulary?*

What have you learned today? How would our vision be different if we had only rods or only cones? How would our vision be different if our three types of cones didn't all work? [Remind students about three types of cones and prompt for colorblindness].

## 4. Close:

5 Minutes

*How can kids learn more? Thanks and good-bye! Clean-up.*

Our eyes are an extremely important part of our body. The constant communication between our eyes and brain allows us to move and react to things, whether it's a baseball thrown toward us, or a car driving down the street. The different parts of the eye are also important, and each has unique qualities. Make sure students remember what rods and cones do and how they are different.

**TOTAL 50 – 60 Minutes**

## **Follow-up – After Presentation**

*Suggest students write a letter explaining "How we learned about \_\_\_\_\_?"*

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

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

Write a letter about what we learned today. Give an example of how our eyes track something (such as a baseball).

