Color of My Eye: Cones: Red, Green & Blue



During this activity, your students will participate in an investigation in which they will learn about peripheral vision, and they will map the cones of the eye. This is a great activity to complete in conjunction with a unit on the eye.

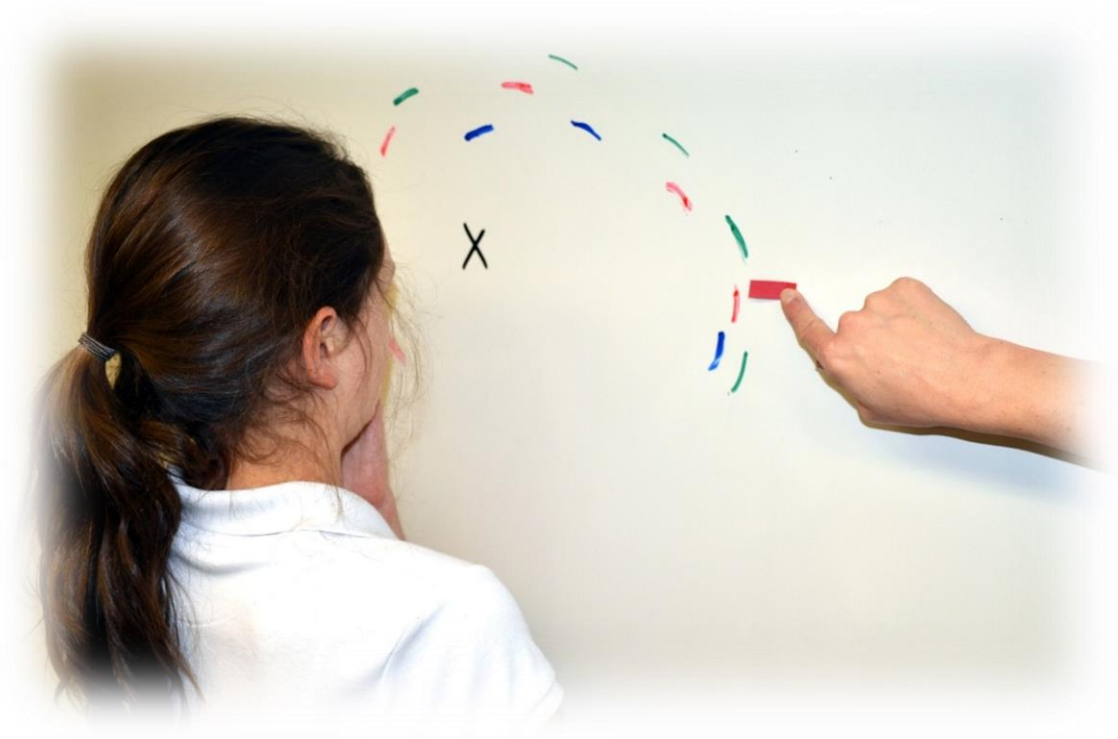
Peripheral vision is our side vision, or the vision perceived by the eye outside the main area of focus. The main area of focus of the retina occurs at the fovea centralis/macula, which is the location in the eye where the sharpest vision occurs; the fovea centralis/macula is dense with cones (photoreceptors of color vision) and is the location of focus during lighted conditions, like reading. The area of the retina outside of the fovea centralis/macula is where larger concentrations of rods are located. Rods are photoreceptors that react to less-intense light and are responsible for our peripheral vision. Rods do not perceive color; as a result, color is not present in our side vision.

Activity:

- Introduce the activity by viewing Art Basics with Dick Termes: Drawing: Spheres Basic. Like many other items found in nature, the eye is a sphere, but it is a very special and complex structure that accommodates a lens to focus light onto the retina and then converts these photons of energy into an electrical impulse sent to the brain. Understanding the basic structure of a sphere and being able to draw it will help students understand the structures and mechanics of the eye.

- Materials: (for each pair of students)
    - Section of whiteboard
    - Small pieces of paper (size of a quarter)
        - Red
        - Blue
        - Green
    - Red, blue and green markers
    - Ruler

- Working in pairs, the students will take turns mapping each other's outer edge of their sharpest vision, where the density of the red, blue and, green cones drastically increases.



- Using a black marker, make a small X on the whiteboard (below). One of the students should stand approximately 1 foot from the board. They should cover their left eye and stare at the X with their right eye. The other student, conducting the test, will randomly slide the colored pieces of paper in from the right side. The student testing their vision should notice the pieces of paper moving in, but they should not be able to identify the color. The pieces of paper should continue to move in until the color is correctly identified. A small line should be made using the same-colored marker. Continue to randomly slide the pieces

of paper in until an arc appears for each color. Continue with the left eye. Three arcs should appear, indicating the outer edge of their sharpest vision, where the density of the red, blue, and green cones drastically increases.

Taking it to the Next Level:

- A dissection of the cow eye series is available at the following website.