Science Experiment: It's all in the Eye: Color and Motion

Project: Health

Supplies:

- **White Poster board, standard size (28"x22") must be flexible**
- **Meter stick (yard stick, 3 foot stick) or 12 inch ruler**
- **Sharpie**
- **Foot long piece of balsa wood or wood stick (chopsticks will also work)**
- **Tape**
- **3 colors of construction paper**

***You may want to have these supplies for each group of 3-5 students, especially if you are working with a group of more than 10-15 participants**

Time: 1 hour

What to Do:

1. Mark the center of the poster board (when displayed horizontal) with "0 degrees." Do this near the top of the board. Also, mark a small "X" in the center of the board below the 0 mark, this is your fixation point.
2. Draw a line from the 0 degree mark, going left and right.
3. Next, using a ruler, mark 10 degrees then 20 degrees all the way to 120 degrees on both sides of the 0 degrees mark. Every 10 degrees should measure out to 1 inch.
4. Cut out Nickel size circles, one from each construction paper color.
5. Use the tape to attach one circle to the end of one stick and do this for all three.
6. Pick one person to act as the first subject. They should hold the center of the poster board so that fixation point is level with their eyes and about 1 foot away from their face. They should bend the rest of the board around them so that the ends of the board line up with their ears.
7. The test subject should focus on the black dot in front of them (fixation point).
8. Someone else chooses one of the sticks. Do not tell the test subject which color you chose. Starting at the 120 degree mark, slowly move the stick toward the 0 degree center. Stop when the test subject notices the stick. Make a mental note angle and continue moving the stick until the subject tells you the color they see.
9. Write down both results.
10. Repeat starting at the opposite side (left or right) and use a different color stick.
11. Switch roles and complete the experiment again. Remember the test subject should never know what color you are using.
12. Repeat the experiment for each subject. Be sure to record your results.

Reflect:

1. Was there a difference between when subjects noticed the stick and when they could see the color?
2. Were the results the same for each test subject?
3. What would make this experiment more difficult or different?

Apply:

Your eye is made up of different parts that help you see. One place your vision starts is with photoreceptors that line your retina, the rods and cones. Rods are great at sensing movement, especially in dim light situation but aren't good at sensing color or focusing well. Cones, however, have high color acuity and focus very well especially in bright conditions. Most of your cones are in the center of the retina, rods are around the cones. *So, with this knowledge, why would it make sense that you saw the stick before you saw the color of the circle?* Why do you need both rods and cones? If cats and other animals can see well in the dark, what might be better developed in their eyes than in human's eyes?