Exploring Color and the Sense of Sight

Summary

Students use diffraction glasses to explore the colors found in the visible spectrum of light. They mix the primary colors using color paddles and liquids to make orange, green, and purple. Finally, students observe the 'dots' used to make colored pictures in magazines.

Time Frame

1 class periods of 45 minutes each

Group Size

Small Groups

Materials

Rainbow/diffraction glasses -- Carolina Biological 755225 $9.50 for 6
lamp -- any desk lamp will do
color paddles -- Carolina Biological 956028 $10.25 for 3 sets of 6
magnifying lenses
colored magazine pictures
test tubes or any small clear cup
food coloring -- red, blue and yellow
100 ml beakers or small bowls
plastic pipettes or medicine droppers
picture of a rainbow

Background for Teachers

Visible light separates into the spectrum red, orange, yellow, green, blue, indigo and violet. These colors can be memorized in order using the saying 'Roy G. Biv'. Diffraction or rainbow glasses separate visible light. Water droplets in the air can also separate visible light creating rainbows. Red, yellow and blue are the primary colors. The secondary colors are red and yellow to make orange, yellow and blue to make green, and blue and red to make purple. Colored magazine pictures are made using separately colored dots placed very closely next to each other. When looking at pictures with our eyes alone, we see one solid color but when pictures are looked at with magnifying lenses the individual dots of colors can be distinguished.

Intended Learning Outcomes

Framing questions. Conducting investigations. Collecting data.
Sharing ideas with peers. Connecting ideas with reasons.

Instructional Procedures

Pre-lab discussion:
Ask students about the 5 senses and explain that today they are studying their sense of sight. Show students the rainbow picture and recite the color names in order. Show students a picture from a magazine and then using the baby picture of the dots explain how magazine pictures are formed. Use the color paddles to demonstrate the primary colors and the mixed secondary colors.
Instructional Procedures:

1. Diffraction glasses:
   Look through the diffraction glasses. Study the colors of the rainbow seen. Recite the color

names in order: red, orange, yellow, green, blue, indigo and violet. Notice that the colors always occur in this order. Have students look out the window, up at the ceiling lights and at a lamp with the glasses on to see the bright effect.

2. Color paddles:
   Have students try mixing the secondary colors of orange, green and purple with the color paddles. Students can then each take a paddle and take turns mixing their color with the color paddle of the other students in their group. When they have seen the combinations they can make, let them look at different objects in the room through the paddles.
3. Magnifying lenses:
   Have the students use a magnifying lens to look at colored pictures in a magazine. Notice how it seems like one color to our eyes without lenses; however, with magnifying lenses they see all the dots that are used in printing colored pictures.
4. Make a rainbow:
   In 100 ml beakers or small bowls, prepare the solutions of the three primary colors using food coloring. Make the solutions fairly dark for the best results. Have each student make the color orange, green and purple by putting in one pipette full of the primary color needed into test tubes. After the three main color combinations are made, allow the students to experiment with different amounts of the colors to see what new colors they can make.

Bibliography

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