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Bouncing Off the Page

Incorporate physics and biology concepts into one lesson that focuses on the art of creating two-dimensional images with the illusion of depth. Students create their own 3-D images and visually perceive how human eyes work together to generate an image that appears to bounce off the page. This activity supports 3-dimensional learning and builds toward the following:

- NGSS Science and Engineering Practice: Constructing Explanations and Design Solutions
- NGSS Disciplinary Core Idea: Middle School Life Science 1.D: Information Processing

Materials Required

Carolina STEM Challenge® 3-D Art and Human Vision (696142)
Black Permanent Marker
White Paper
Scissors
Tape

Activity Procedure

1. Select a line drawing, and cut out the four component images of that line drawing.
2. Obtain 4 acetate sheets. Label the acetate sheets 1–4 in the upper right corner.
3. Place the acetate sheet labeled “1” on top of the partial line drawing labeled “1.” Using black ink, trace the black lines on this acetate sheet. Allow time for the ink to dry.
4. Using red ink, trace the red lines on acetate sheet 1.
5. Place the acetate sheet labeled “2” on top of the partial line drawing labeled “2.”
6. Using cyan ink, trace cyan lines onto acetate sheet 2.
7. When all lines have been traced and the ink is dry, assemble the front layer of the anaglyph by placing acetate sheet 1 on top of acetate sheet 2.
8. Shift acetate sheet 1 slightly to the left so that the red lines are to the left of the cyan lines.
9. Place the acetate sheet labeled “3” on top of the partial line drawing labeled “3.”
10. Using red ink, trace the red lines on acetate sheet 3.
11. Place the acetate sheet labeled “4” on top of the partial line drawing labeled “4.”
12. Use the cyan ink to trace the cyan line on acetate sheet 4.
13. When all lines have been traced and the ink is dry, assemble the back layer of the anaglyph by placing acetate sheet 3 on top of acetate sheet 4.
14. Shift acetate sheet 3 slightly to the right so that the red lines are to the right of the cyan lines.
15. Assemble the anaglyph by placing the front layer (sheets 1 and 2) on top of the back layer (sheets 3 and 4). Place the stacked sheets on a piece of white paper.
16. View the completed image through the red/cyan 3-D glasses to observe the three-dimensional illusion.

(continued on back)

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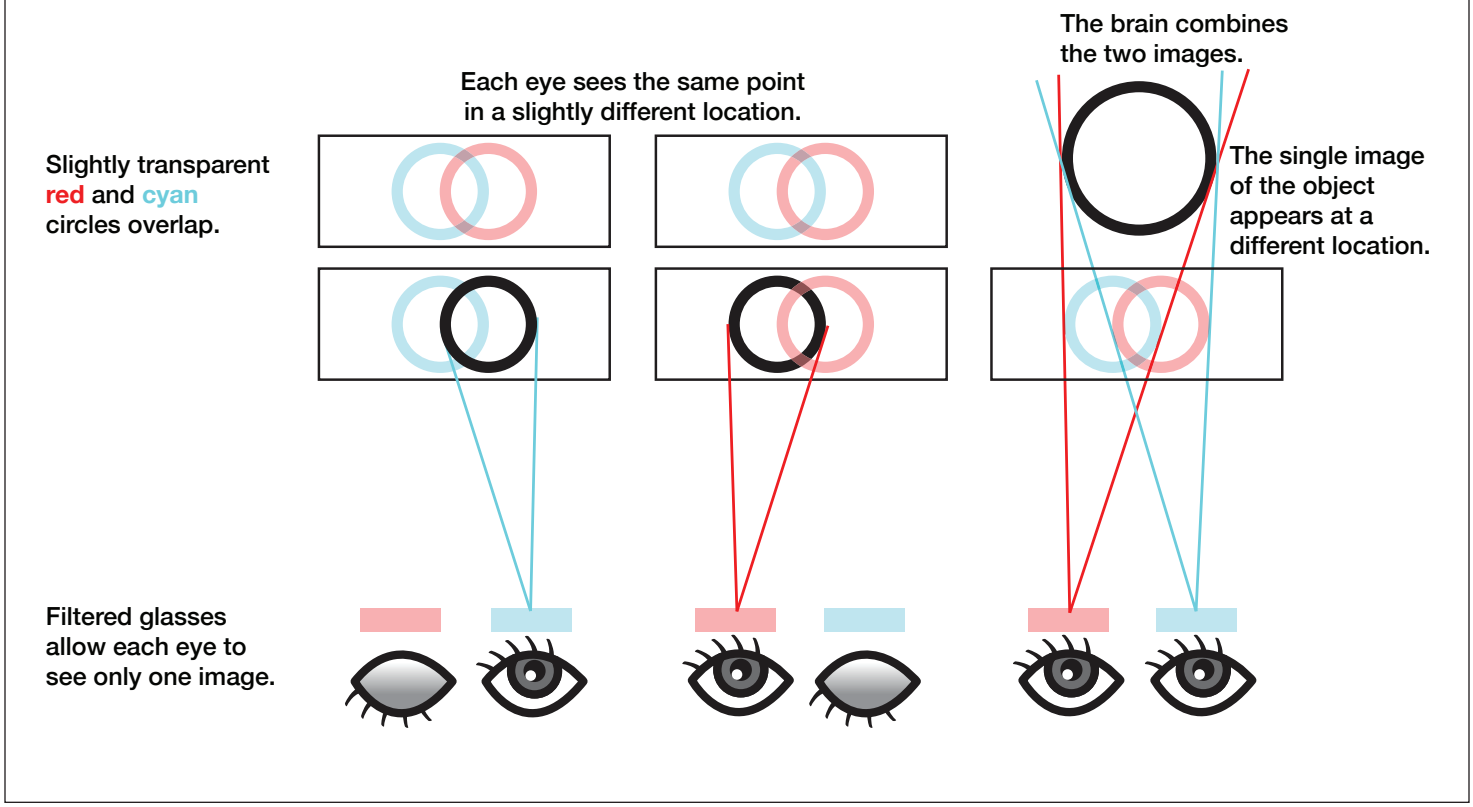

Summary

The science behind human eyesight relies heavily on the communication between the eyes and the visual cortex, which is in the posterior portion of the brain. Humans rely on binocular stereoscopic vision, which involves two eyes seeing slightly different images due to observations being made from two slightly different points. The brain converts the two slightly different images into a single image that denotes depth. When looking through the colored filters in 3-D glasses, both eyes are open but only one of the two overlapping images is transmitted to each eye. This feature allows us to perceive depth within a two-dimensional image.

Additional Information

View more information, content links, and products related to this activity at **www.carolina.com/takeaways**.

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