

RAFT IDEAS

Topics: Vision, Function of the Eye, Illusion

Materials List

- ✓ 35 squares of dark cardstock (2.5 cm or 1" works well)
- ✓ 35 squares of white cardstock (the same size as the dark squares)
- ✓ 7 Strips of dark cardstock (width of squares x 30 cm (12") long)
- ✓ One large piece of dark cardstock ~30 x 20 cm (11" x 8")
- ✓ 2 Strips of cardstock 6 mm x 20 cm (1/4" x 8")
- ✓ Double-stick tape
- ✓ Optional: White magnet sheet and black squares of sticky-back vinyl

This activity can be used to teach:

Next Generation Science:

- Senses (Life Science, Grade 4, 1-2; Middle School, 1-8)
- Light reflecting from objects and entering the eye allows objects to be seen (Grade 4, Physical Science 4-2)
- Waves are reflected, absorbed/ transmitted (Middle School, Physical Science 4-2)



Developed and written by Coral Clark (RAFT)
From the Exploratorium Bathroom Wall exhibit

The Café Wall Illusion

Seeing is Sometimes Not Believing



Illusions are wonderful student motivators! When people realize that sometimes "they cannot believe their eyes", they often want to know why. It took scientists months of research and many experiments to figure out why this simple pattern of black and white tiles outside a café in Bristol looked like a bunch of wedges.

Assembly

1. Tape or glue the squares of cardstock onto the wide strips of cardstock, alternating light and dark.
2. Place all of the wide strips onto the large piece of cardstock, so that they appear like a tiled wall. Do NOT attach the wide strips onto the backboard.
3. On the ends of the backboard, attach the 6 mm (1/4") strips vertically in order to secure the "tiled" strips. You should be able to slide the "tiled" strips so that students can test different configurations.

Alternate Design: magnetic version. Cut 2.5 cm (1") strips of white magnet sheet. Place 2.5 cm (1") pieces of sticky-back vinyl every other inch along the strips. Follow instructions in "To Do and Notice", placing the white magnet sheet strips onto a metal surface (e.g. – steel-backed white board).

To Do and Notice

1. Line up the strips of cardboard squares so that they look like the tiles in the picture above of the café at St Michael's Hill, Bristol, England.
2. Notice that the horizontal lines appear to curve and do not appear horizontal
3. Try moving the strips so that the squares look like a checkerboard, and notice that the illusion of non-horizontal lines disappears.
4. Try other configurations. When does the illusion appear?

The Science Behind the Activity

Optical Illusions occur for a variety of reasons. All are associated with a specific part of the vision process that begins with light traveling through the cornea and into the eye, causing neurons on the retina (rods or cones) to send signals to the brain, and ends with interpretation within the visual cortex itself. The café wall illusion occurs in the brain (visual cortex), and is caused by the brain assuming that the unclear lines that form between the light and dark tiles do not exist. This assumption alters the way that the brain interprets information from the real world.

Web Resources (Visit www.raft.net/raft-idea?isid=21 for more resources!)

- For more information on this and other illusions, visit:
<http://www.at-bristol.org.uk/cafewall.html>
- For an on-line version of this activity, go to:
<http://www.exploratorium.edu/seeing/exhibits/caffe.html>

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