Project LITE

Light Inquiry Through Experiments

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Rotating Trapezoidal Window

Adelbert Ames, Jr. designed approximately twenty demonstrations that probe the nature of depth perception. One of the most effective is what he named the "rotating trapezoidal window." In its original form, the window was designed to be constructed as a thin - almost two dimensional - surface, painted on both sides to resemble a normal rectangular window when viewed from one orientation. It is actually made in the shape of a trapezoid with cutouts where glass might be and it includes appropriately painted shadows. The window is then placed on a pivot oriented perpendicular to its horizontal axis. When rotated slowly in one direction - and viewed either monocularly from a short distance or binocularly from a large distance - the window appears to oscillate rather than rotate about its axis. During its perceived oscillation, the window also appears to change size and shape. This phenomenon can be explained as arising from the equivalent retinal projects of either an oscillating normal window or of a rotating trapezoidal window. This demonstration suggests that prior experience plays a strong role in the brain's decision as to which of the two interpretations is more likely in the real world.

Original References:

Ames, A. "Visual Perception and the Rotating Trapezoidal Window." *Psychological Monographs*, vol. 65, No. 7, (whole No. 324), 1951.

---. *An Interpretive Manual for the Demonstrations*, 1955.

Ittelson, W. H. *The Ames Demonstrations in Perception*, 1952.

Credits:

This version of the Rotating Trapezoidal Window was designed by K. Brecher and R. Puno (Boston University). Project LITE is supported by NSF Grant # DUE - 0715975.

CONSTRUCTION GUIDE

1) Print the second page on thick paper.

2) Fold it on the dashed line.

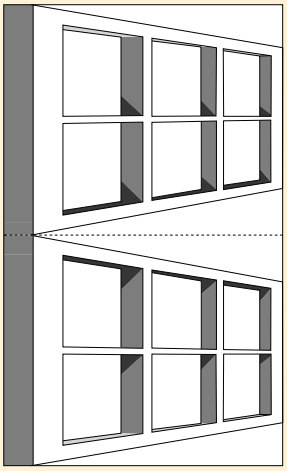
3) With the sides still overlapping, cut along the solid lines.

4) To make the pivot, flatten or cut a segment from one end of a drinking straw.
Alternatively, you could also use a large paper clip, bent as as shown in picture 2.

5) Unfold the pattern and turn it to the blank side. Tape the flat end of the straw or paperclip to the higlighted area in picture 3.

6) Fold the pattern again and paste the two sides together. For best results, glue stick or rubber cement is recommended.

Optional: Cut out the inner rectangular parts of the windows (the areas in blue in picture 4)



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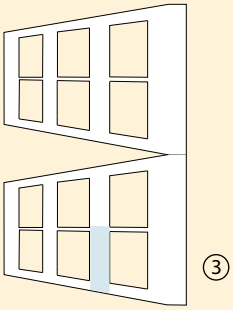

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