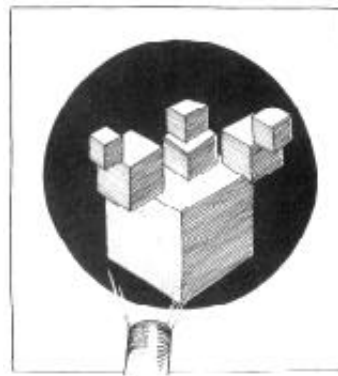
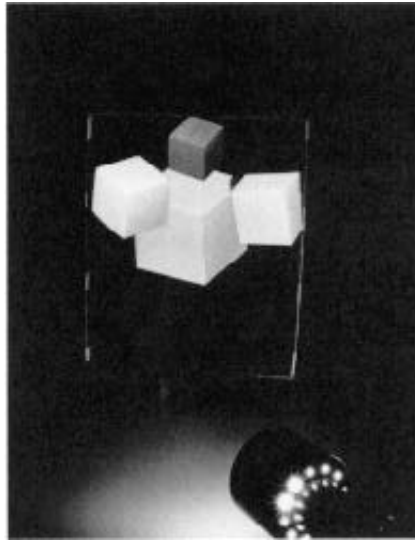




## Far Out Corners

**Your experience of the world influences what you see.**



Perception

When they first glance at this exhibit, many people say, "What's the big deal? It's just a bunch of boxes." But there are no boxes at all. A closer look reveals that the *Far Out Corners* exhibit is a cluster of corners lit from below. When you walk past the exhibit with one eye closed, the cubes will seem to turn mysteriously so that they follow your movement.

### materials

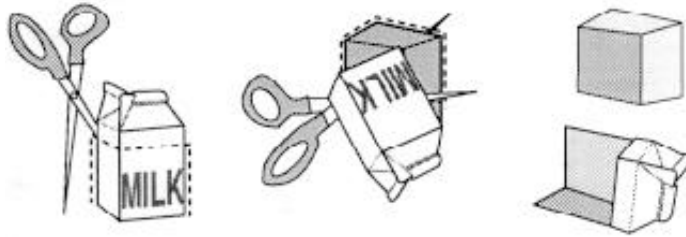
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- ✓ **A large cardboard box** measuring about 19 x 15 inches (48 x 38 cm).
- ✓ **Flat black spray paint.**
- ✓ **Thick, white, nonflexible posterboard** measuring at least 15 x 15 inches (38 x 38 cm).
- ✓ **X-Acto™ knife** or matte knife.
- ✓ **Masking tape** or transparent tape.
- ✓ **A bright free-standing lamp.**
- ✓ **Adult help.**

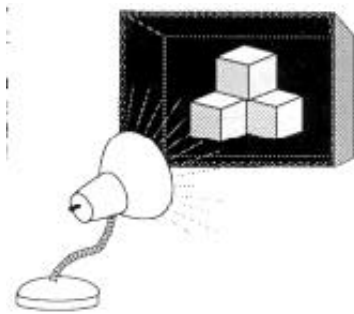
## assembly

(1 hour or less)

You can cut the inside corners from square-cornered containers, such as clean milk cartons or tissue boxes, or you can make your own corners from posterboard. To make your own, use an X-Acto™ knife or matte knife to cut the posterboard into nine squares, each of which measures 5 x 5 inches (13 x 13 cm).



Now use three of the squares to construct a partial cube or corner in the following fashion: Tape two squares together at one edge; open each of the two squares into a right angle; tape the third square on top of the first two squares. Make three partial cubes, or corners.



Spray-paint the inside of the large cardboard box black. When the box is dry, arrange the corners so that two are side by side on the bottom of the box, as shown. Make sure the hollow open sides of each corner are facing out toward you and down. Tape them so they are tilted up at a small angle. Place the third corner as far forward as possible on top of the original two, also tilted upward. Tape all three corners in place. Now position the light so that it shines directly into the box.

## to do and notice

(15 minutes or more)

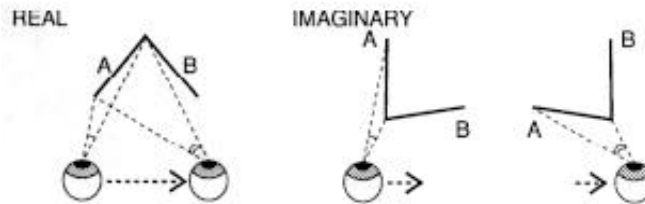
Stand back ten feet and close one eye. With a little mental effort, you can see the corners that you have constructed as three-dimensional cubes rather than hollow corners.

Walk back and forth parallel to the box. Notice that the cube on top seems to be following you as you move.

## what's going on?

The first step to successfully seeing the top partial cube turn with you lies in your ability to perceive it as a complete six-sided figure. This perception has a lot to do with being raised in a society that recognizes cubes as a common shape. Your brain is used to seeing cubes, so it fills in the rest of the cube shape, even though this partial cube only has three sides.

As you move past the exhibit, your view of the corners changes in a way that would not make any sense if the corners were stationary cubes. Your eye-brain system is used to seeing things that are near you move faster than things that are farther away. When you are riding in a car, for example, nearby objects seem to whiz by, whereas distant objects seem to follow you at a slower pace. Since you perceive this inside corner to be the outside of a solid cube, your brain "sees" the corner farthest from you as being the closest. To maintain this misconception, your brain perceives a rapid rotation of the cube as your angle to the corner changes.



The diagram above shows how this illusion works. In the real situation, as your eye moves to the right, it sees more of side A. In order to see more of side A of the imagined corner, the perceived cube must be seen to rotate as you move.



**Questions? Comments? Want to share your results?**  
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