Reverse Mask

Description:

In the above photos, the pharaoh's face is, believe it or not, concave. When viewed from a distance, especially with one eye closed, the face appears to be convex. The reverse mask shown above is commercially available. A small light bulb located beneath the face produces the illumination. An inexpensive Halloween mask may be used to produce equally striking results. When the white, concave side of the mask is illuminated from below, it appears to "pop out."

A concave mask exhibits another amazing property: it seems to follow you as you move past it! You will notice that the pharaoh's face is looking into the camera, regardless of camera position.

Purpose:

This exhibit illustrates a statement made by neuro-psychologist Richard Gregory: "We not only believe what we see, we also tend to see what we believe." We have learned that faces are convex, so our eye-brain system interprets the concave face to be convex. Also, we are accustomed to seeing the subtle shadows produced when convex faces, like yours and mine, are illuminated from above. It turns out that the same shadowing results when light from below illuminates a concave face.

You may wish to have your students experiment with lighting. Suggest that they try illuminating the concave side of an inexpensive mask from both top and bottom. If the mask is translucent, have them try illuminating the mask from behind. Light passing through the mask will sometimes produce the shadows needed to give the illusion of convexity.

Reverse Mask

TO DO AND NOTICE

* Notice that the mask is concave. That is, it is sunken in.

* Stand about ten feet back from the reverse mask, close one eye and look at the face. You may be surprised to find that it now looks normal, that is, convex.

* Walk to the left and right while you look at the face. The face will seem to follow you no matter which way you move!

WHAT'S GOING ON?

Your eye-brain system has learned that faces are usually convex, that is, curved outward. You therefore tend to see what you expect to see. Furthermore, it is difficult to judge depth with only one eye. When you see the face with one eye closed and from far away, your brain cannot tell the the face is concave.

Notice also that the face is illuminated from below. We are accustomed to faces that are illuminated from above either by the sun or artificial lighting. Our nose, cheeks and other facial features block the light from above, creating shadows on our face. It turns out that the shadows produced by a convex face lit from above are the same as those produced by a concave face illuminated from below. Thus the way in which the reverse mask is illuminated enhances the illusion.