



Mirrors and Reflections

Reflections in mirrors and various surfaces are intrinsically interesting. People have a fascination with mirrors. They reveal something about our psychological self. Various myths have been put forth about the power of mirrors such as that of Narcissus. In ancient china mirrors were so valued that they were buried with the person. Reflections have a universal appeal.

DaVinci became fascinated with mirrors after witnessing concave mirrors used to focus sunlight into an intense beam that would solder together sheets of metal. According to Isaacson Leonardo made almost two hundred drawing in his notebook that show how to make concave mirrors that will focus light rays from varying angles. (Isaacson, p 38) He also would make many diagrams of how light rays reflected from a curved surface showing how the rays were reflected. (Isaacson, p 458.)

Reflecting surfaces have been used to study the properties of light from ancient times until today. Flat and curved mirrors provide opportunities to refine one's understanding of how light is reflected. Curved mirror surfaces give distorted reflections which can be a source of play and fascination. Transparent mirrors such as plastic or regular glass can be used to make a device for copying drawings.

During the exploration of flat and curved mirrors in art students can use their discoveries to make simple sculptures reflecting faces or parts of their bodies. Or, they can make abstract geometric drawings based on the way light is reflected off the mirrors. In science they can systematically investigate angular relationships and properties of reflective surfaces.

Some contemporary artists such as Anish Kapoor have made sculptures out of highly reflective metal. Kapoor designed Cloud Gate a very large piece for Chicago and smaller pieces that are in various museums. Examples of his work can be found on the internet.

Materials: Mirrors such as those called locker mirrors, sheets of Plexiglas, or transparent plastic, cardboard, flashlight, laser pointer (optional)

Activities with a variety of mirrors and reflective surfaces are described in detail in the curriculum guide *Mirrors* available at Kelvin,bernie zubrowski.

ART

Reflections in two mirrors

Using two mirrors students explore different arrangements that result in their bodies or faces having strange shapes. A starting question: How can they arrange the two mirrors to have multiple reflections?

Mirror Monster Game

A grid on a large sheet of paper is drawn. Square pieces of cardboard are cut. The game is to stand these pieces of cardboard on lines of the grid to form a maze by one student. Then another student tries to arrange two or more mirrors within the maze of cardboard squares to reflect light from a flashlight unto a picture of a monster that is at the end of the maze.

Multiple Face Moving Sculpture

This can be set up as an exhibit for a few students to set up and other students to explore.

Several sheets of square Plexi glass are hung on a wood frame using ribbon as the support for the sheets. When a flashlight is shone on a face in front of the sheets, one can see multiple reflections. If the sheets are moving a weird vision happens.

SCIENCE

Reflections in two mirrors

Students systematically explore how reflections change as two hinged mirrors are moved to create multiple images. How does the number of reflections change as the angle between the two mirrors becomes smaller?

Mapping reflections

Students systematically explore how a collimated light beam is reflected off of one mirror. (Or, they can use a laser pointer but safety procedures need to be followed.)

Reflections from transparent materials

Exploring and experimenting with reflections from transparent sheets of plastic.

Curved Mirrors

Using Mylar students explore what happens when light from a flashlight is reflected off curved surfaces.

Making an exhibit

An exhibit made from a thin mirror Plexiglas can be set up for students to make funny faces.

Light show

Creating a light show with Mylar and other reflective surfaces.

Reflections from curved surfaces

Experimenting with the way light is reflected from curved surfaces.