Light and Color—Hidden Messages

Objective

The student will construct, experiment, and observe with designs viewed through color filters.

Science and Mathematics Standards

Science Standards

☑ Science as Inquiry
☑ Physical Science

Mathematics Standards

☐ Problem Solving
☑ Communication
☐ Connection
☐ Computation/Estimation
☑ Measurement

Theory

A totally transparent piece of glass transmits all wavelengths of light. An opaque object will transmit no light at all. A red filter transmits red, a blue filter transmits blue, and a yellow filter transmits yellow; so that all other colors are absorbed or subtracted. Some manmade sources of light, such as fluorescent bulbs, cause objects to appear to be different colors because they do not generate all the wavelengths of white light.

Materials

- white paper
- highlight or pastel magic markers (three or more colors)
- transparent color filter or cellophane in a variety of colors
- a card with several hidden messages of different colors (handmade)

Procedures

1. Using at least 3 different magic marker colors, draw a design. Think in terms of space and astronomy designs.

2. Use magic markers to draw more designs, be sure to include at least one hidden message in your designs. Can you hide three or more messages in one design?

   (Students should use a space or astronomy word as their hidden message and then draw designs over it.)

3. View the design through several filters.

Observations, Data, and Conclusions

1. When you viewed the designs without a filter, what did you see?

2. What did you see when you looked at your design with each colored filter?

3. What did you see when you used two different filters together?

4. Why did you see different things with each different filter?

5. If possible, exchange designs with another person and read their secret message.