COOL COLORS

RYAN JONES

Time Frame:	Standards:
60 minutes 5th Grade	**5.S.5.1.1** Identify issues for environmental studies **5.S.1.3.2** Measure in both US Customary and International System of Measurement

Objectives:

The students will prove that the color of an object can affect the absorption or reflection of heat energy.

Background Information:

The sun is the primary source of all energy on earth. It drives our water cycle, creates wind and ocean currents, and provides the entire world's food energy. Every day it provides light and heat, or thermal energy. There are factors that affect the sun's heat such as location, time of day or year, and color. Color is an important factor in solar radiation. Black or dark –colored objects absorb solar radiation and become hotter, while white or light colored objects reflect solar radiation.

Solar radiation passes through transparent material and heat energy is trapped, like a car on a hot summer day. The color of the car can make quite a difference in temperature. The color of the roof on a building can also greatly affect the energy needed to heat the building in the winter or cool in the summer.

Materials:

- Cans - a minimum of four
- Poster Paint – white, black, red, green
- Hot Water
- Thermometers
- Plastic wrap
- Plastic wrap
- Rubber bands
- *Student Data Sheet*, one per student or per group

Procedure:

1. Divide the class into group of four. Instruct students that they are going to be home builders, heating and air conditioning contractors, architects, fashion-clothing designers, or automobile designers. Each group will paint four cans: one white, one black, one red, and one green. Give each group a data sheet.

2. Have each group fill its cans with the same amount and temperature of water. The water should be cold. Put a thermometer in each can and cover top with plastic wrap fastened to the can with a rubber band. The cans should then be placed in the sun. Record the temperature every five minutes for 30 minutes. Make a data table on the board (similar to the *Student Data Table*) on which to record each group's results. Make a bar graph on the board to illustrate the student's data (average). Repeat using hot water.

3. Following the experiment, ask students which colors would be best for roofs and for painting homes, schools, and other buildings to keep them warm in winter or cool in the summer. Which color clothes would be warmer in the winter? Cooler in the summer? What color would they choose for car's exterior or interior if they lived in the south where it is hotter or in the north where it is cooler? How can choosing the best color save energy? Is color an important consideration for different occupations?

Extra: Read *Sunny*, the *Cool Puppy*, an interactive listening activity, to the class.

Assessment:

Ask students the following questions:

On a warm summer day, what color clothes would you wear to stay cool?

What color house would be warmer in the winter – red, white, black, green?

What color of shingles would you want on your roof if you lived in Mexico? In Alaska?

What color would you prefer for your car's interior if you lived in Texas? In Ontario?

Additional Content:

See attachment of data sheet and story of "Sonny the Cool Puppy"

References:

National Energy Foundation-Resources for Educators
Energy Fun-Integrated Learning Activities-Primary
3676 California Ave. Suite A117
Salt Lake City, Utah 84104
801-908-5800
info@nef1.org