

## West Side Science Club – Event # 3– “Light I”

### Original Presentation

Date: 1 December 2012  
Time: 10 am to 12 pm  
Site: West Side Science Club

### Big Questions

- These questions are meant to frame the day’s event and might be written on the chalkboard
  - (1) What are some of the properties of light?
  - (2) How are colors related to light and energy?

### Concepts

- Concepts to cover from the “Work of CCI Solar” Mind Map: Light- transmission, absorption, reflection, energy, wavelength, frequency, parts of spectrum

### Lesson Plan

#### *Student Objectives*

- Understand that light has a component of energy
- See how that energy of light can be related to color
- Observe how colors of light and objects interact (reflect, absorb, transmit, etc)

#### *Schedule/Agenda*

- Review: Event # 2–“Field trip to Caltech” (15 min.)
- Activity: Lasers and gummy bears (35 min.)
- Activity: Jar of gumballs in red cellophane (15 min.)
- Activity: Mixing frosting colors (45 min.)
- Wrap-up (10 min.)

## Materials

### Activity: Lasers and gummy bears

- 3 laser pointers: red, green and purple
- Variety of colors of gummy bears

### Activity: Jar of gumballs in red cellophane

- Jar
- Red cellophane/saran wrap
- Lots of colors of gumballs

### Activity: Mixing frosting colors

- Food coloring in a variety of colors
- White frosting
- Cups
- Spoons
- Cookies

## Safety

- Do not look directly at the laser pointers. It can cause serious eye damage

## Review of Previous Event: Field trip to Caltech

- Recall the tours: Caltech scientists talked about their research on energy and finding ways to use the sun to generate fuels (ie using sunlight to make hydrogen gas from water)

## Facilitation Questions

- How can you tell that the sun gives off energy? How do we perceive the energy?
- If light is a form of energy, how can we capture it or tell how strong it is?

## Activity: Lasers and gummy bears

### Procedure

1. Use a laser pointer and shine it at a gummy bear of the same color (ie red and red or green and green)
2. Observe what happens to the light when it reaches the gummy bear
3. Use a laser pointer and shine it at gummy bears of different colors than the laser color
4. Observe what happens to the light in each of these cases

## Facilitation Questions and Advice to Mentors

- Try and use the vocabulary of reflect, absorb and transmit

- Be sure to think about cases where some wavelengths of light in the laser and the gummy bear may overlap, but not all (ie purple laser and red bear or green laser and yellow bear)
- Also be sure to use complimentary colors to see what happens in these cases (ie red and green bears and lasers or purple laser and yellow bear)

### **Activity: Jar of gumballs in red cellophane**

#### **Procedure**

1. Fill a jar with gumballs of a variety of colors
2. Wrap the jar in red cellophane or other colored filter
3. Have the students count how many different colors of gumballs are in the jar
4. Next remove the cellophane and have them count again
5. Discuss how the red cellophane could have made the original guess at the number of colors lower

#### **Facilitation/Concept Questions**

- Why do objects appear to have colors to us?
- If we filter out certain colors of light, how does that impact perception of other colors?

### **Activity: Mixing frosting colors**

#### **Procedure**

1. Give every student a cup of white frosting and a mixing spoon
2. Have them make predictions, then allow them to mix together a few drops of different food coloring dye
3. Be careful to not to add too much or too many colors or the frosting will turn black
4. Discuss all the color creations and results
5. Frost some plain cookies with the colored frosting and enjoy!

#### **Facilitation Questions and Concepts**

- Can you plan or predict what color you will get from mixing certain dyes?
- Why does adding larger amounts of dye or too many colors result in black frosting?
- Can two people add the same colors and get different results? Why?

### **Check for Understanding**

- What does color have to do with light?
- How can we measure the energy of light?