

Name \_\_\_\_\_

Date \_\_\_\_\_

QuickTime™ and a  
decompressor  
are needed to see this picture.

## Light Can Do So Much!!

Use the materials in front of you to determine if the following statements are true or false. Then briefly explain your answer on a separate sheet of paper. If you need help, use the hint cards, and don't worry if you don't get through all of them. We will discuss them as a group.

1. \_\_\_\_\_ We can detect the whole electro-magnetic spectrum.
2. \_\_\_\_\_ Light is a form of energy.
3. \_\_\_\_\_ Light with a large wavelength has more energy than light with a small wavelength.
4. \_\_\_\_\_ A leaf is green, because chlorophyll absorbs the frequency of light that corresponds to green.
5. \_\_\_\_\_ Black is a color.
6. \_\_\_\_\_ White light is the absence of color.
7. \_\_\_\_\_ The color of an object is a property of the object itself.
8. \_\_\_\_\_ If red, blue and green light are combined, white light is formed.
9. \_\_\_\_\_ The sky is blue because it reflects the ocean.
10. \_\_\_\_\_ Light stops when it hits you or any object.
13. \_\_\_\_\_ Light travels in a straight line.
14. \_\_\_\_\_ I can determine the exact location of any object just by looking at its image in the mirror.

15. \_\_\_\_\_ Light travels at the same speed in air and in water.
16. \_\_\_\_\_ All frequencies of light will refract in glass at the same angle. (Think about a prism.)
17. \_\_\_\_\_ Light rays can be bent.

### **Homework:**

Using the properties of light, explain the following situations. (Use a separate piece of paper).

1. If you shine a bright red light onto a rose and its leaves, the leaves will feel warmer than the flower.
2. A fish will appear farther away and closer to the surface to a fisherman sitting at the edge of a pond.
3. If I shine a blue light on a yellow shirt, the shirt will appear grayish black.
4. People usually wear white or light colored clothes in the summer, and black or dark colored clothes in the winter?

**Search the web to find an interesting phenomenon concerning light. Be able to explain why it occurs. If you can find the right materials, demonstrate for your class.**

# MIRROROPTICS

## Questions to ponder:

How are we able to see things behind us when looking into a mirror, glass or water?

If light stopped every time it hit something, would we be able to view ourselves in the mirror?

## Materials

Mirrors  
Any objects  
Flashlight  
Protractor

Using the above materials, answer the following: (verbally)

Is the angle of incident light hitting a mirror the same as the angle of reflection?

Is it possible to see an object on top of a desk, if you're underneath? How?

# MIRROROPTICS

## Questions to ponder:

How are we able to see things behind us when looking into a mirror, glass or water?

If light stopped every time it hit something, would we be able to view ourselves in the mirror?

## Materials

Mirrors  
Any objects  
Flashlight  
Protractor

Using the above materials, answer the following: (verbally)

Is the angle of incident light hitting a mirror the same as the angle of reflection?

Is it possible to see an object on top of a desk, if you're underneath? How?

## **This paper is white. Or is it?**

What makes my shirt green, your pants red, and her skirt blue? If we stand in a room with no light, what color do they appear?

Is this sheet of paper absorbing any visible light wave frequencies?

Using a flashlight and the color panels, can you make this piece of paper appear yellow?

What happens when you combine you combine red and green light?

Red and blue?

Blue and green?

What are the primary colors of light?

Can you make the yellow construction paper appear red?

(hint: yellow paper absorbs blue light and reflects red and green.)

## **This paper is white. Or is it?**

What makes my shirt green, your pants red, and her skirt blue? If we stand in a room with no light, what color do they appear?

Using a flashlight and the color panels, can you make this piece of paper appear yellow?

What happens when you combine you combine red and green light?

Red and blue?

Blue and green?

What are the primary colors of light?

Can you make the yellow construction paper appear red?

(hint: yellow paper absorbs blue light and reflects red and green.)

## The Sky is Red!

The atmosphere contains nitrogen, oxygen and many other particles that are able to scatter light in all directions. High frequency waves or those that have short wavelengths are easily scattered by the light.

### Materials:

Clear dish      Water      Eye droppers      Milk      Flashlight

Using the materials above answer the following questions. (verbally)

1. When sunlight passes through the atmosphere, what colors would be scattered first? Therefore, what color do we see in the sky?

2. When there are lots of particles in the atmosphere, what is the only color that gets through without scattering?

(Hint: Drop a small amount of milk into the water dish to simulate extra particles in the atmosphere. Shine the flashlight through the side and look at the light straight on. What color do you see?)

3. Why do we get beautiful red/orange sunsets?

## The Sky is Red!

The atmosphere contains nitrogen, oxygen and many other particles that are able to scatter light in all directions. High frequency waves or those that have short wavelengths are easily scattered by the light.

### Materials:

Clear dish      Water      Eye droppers      Milk      Flashlight

Using the materials above answer the following questions. (verbally)

1. When sunlight passes through the atmosphere, what colors would be scattered first? Therefore, what color do we see in the sky?

2. When there are lots of particles in the atmosphere, what is the only color that gets through without scattering?

(Hint: Drop a small amount of milk into the water dish to simulate extra particles in the atmosphere. Shine the flashlight through the side and look at the light straight on. What color do you see?)

3. Why do we get beautiful red/orange sunsets?

My Pencil Broke!!!

Put a pencil in a beaker of water and observe it from the side. What do you see?

Which way did the pencil appear to bend underwater? (Away from the surface or toward the surface)

Do you think light travels slower or faster through water than through air?

My Pencil Broke!!!

Put a pencil in a beaker of water and observe it from the side. What do you see?

Which way did the pencil appear to bend underwater? (Away from the surface or toward the surface)

Do you think light travels slower or faster through water than through air?