



## Colors of the Sky

**Description:** As a group, students will examine different pictures of the sky and brainstorm about how the sky's color is being produced in each picture. As a whole class the students will watch the teacher recreate the colors of the sky with the listed materials. The students will record observations and results. Considering results and observations, students will be asked to explain why the sky is blue and why sunsets are red. Students will explore concepts of how light travels and produces different colors. Students will be asked to relate learned concepts to real world phenomena.

*You may choose to have students work in groups for this activity*

**Duration:** Two 50-minute sessions

**Goals:** Students will develop an understanding of how light travels.

**Objectives:**

1. Students will learn that the sun emits energy in the form of white light.
2. Students will understand how visible light is actually made up of a variety of colors. (prisms)
3. Students will observe short wavelengths (blue) and long wavelengths (red) of light.
4. Students will be able to communicate relationships between experimental observations and real world phenomena.

**Materials:** (for each group of students)

- transparent box or aquarium
- flashlight
- spoon
- 1/2 cup of half & half
- 1 white 3x5 index card (blank)

“Colors of the Sky” Worksheet for each student



## Vocabulary

1. White light - The sun produces light which is made up of all colors of the color spectrum: red, orange, yellow, green, blue, indigo, and violet.
2. Scattering - Light travels in a straight line until it strikes an object. Upon contact the path and direction of light changes, producing the scattering of light waves.

## Background Information

### *Scientific Explanation:*

When sunlight travels through the air the light collides with particles and scatters (changes direction) The sun produces white light, which is made up of all colors: red, orange, yellow, green, blue, indigo, and violet. Light is a wave, and each color corresponds to a different wavelength. The shorter the wavelength of light, the more it is scattered when it hits an object. Because it has a shorter wavelength, blue light is scattered ten times more than red light. Therefore, the sky appears blue. When the sun is setting, light takes a longer path through the atmosphere. By the time the light of the setting sun reaches your eyes, most of the blue light has been scattered out. The light you finally see is reddish-orange.

### *Focus Phase:*

Show students a picture of the sky and ask,

"What color is the sky?"

"Why do you think the sky is this color?"

"Is there any time when the sky is a different color?"

Have students' think-pair-share to facilitate student discussion, and develop a class list of "Our Best Thinking So Far."

### *Challenge Phase:*

#### Teacher Narration

"Why is the sky blue? Why are sunsets red? Use the materials that have been given to you (aquarium, flashlight, half & half, index card, and spoon) to recreate colors we see in the sky. What do you notice about the colors that are produced?" Students will work in groups of four to recreate the colors of the sky. Each student has a designated job: materials pick-up, dropping half & half into the aquarium, stirring the mixture, and materials clean-up. Students will record observations and thoughts on an outlined worksheet of the experiment. Directions are also on this worksheet (see Colors of the Sky worksheet).



**After the activity:**

Ask students to share how they recreated the sky and its colors. Update “Our Best Thinking So Far” by writing results and observations on the board. Draw a diagram of the sun and the earth on the board. Ask students, "Considering the results of our investigation and recreations, why is the sky blue and why sunsets are red?" Using the diagram, discuss the path light travels from the sun and what happens when light hits the earth's atmosphere. Also discuss how light travels in patterns of waves and how the length of each wave affects color. Help students make connections to short wavelengths appearing blue in color and long wavelengths appearing red.

**Prediction**

Ask students, "What will happen to the colors if we dump more half & half into the tank?" Students should make predictions. Students dump more half & half into the tank and make observations. Ask students, "Comparing our tanks to the real world, what situations might cause the same results?" (Similar situations could include forest fires, pollution, smog, etc.) "Why, during the recent forest fires, did the sky appear reddish in color?"

**Assessment:** Collect students' worksheets to check for completeness. Students will demonstrate what they have learned through a homework assignment.

**Homework:** Ask students to find or draw a picture of the sky. In three sentences or more, students should describe how the color of the sky in the picture is being produced.