



## Sky Observers

### **Purpose**

- To engage students in active observation and recording skills.
- To help students observe sky color, recognize that sky color changes.

### **Overview**

Each day for a week, students will observe the color, visibility, and conditions of the sky during the day and again at sunset. During each observation, students will complete either a *Daytime Sky Report* or a *Sunset Sky Report*, recording sky conditions and drawing what they observe. At the end of the week, students will compare their observations and discuss the differences between observed colors depending on time of day and sky conditions.

### **Student Outcomes**

Students will make observations of the sky, record their findings and share their observation reports with their peers. Students will notice that location of the Sun in the sky affects sky color, and that the color of the sky changes under different conditions. They will notice patterns by comparing their own sky observations over time and by comparing their drawings to those of their peers. They will discuss how their observations of the sky during daytime and at sunset aligns with what they learned in the storybook about sky color.

### **Time**

- Part 1: One 45 minute class period
- Part 2: 15 minutes daily for daytime observations and students continue to make sunset observations during after school hours
- Part 3: One 30 minute class period

### **Level**

Primary (most appropriate for grades K-5)

### **Materials**

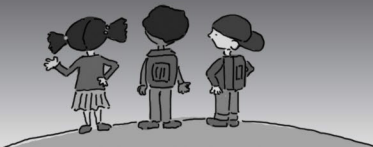
#### **Part 1:**

- Elementary GLOBE storybook: *What's Up in the Atmosphere? Exploring Colors in the Sky*
- Copies of, or access to the webstory: *Become an Atmosphere Observer*

- Copies of *Daytime Sky Report*
- Copies of *Sunset Sky Report*
- Pencil and colored pencils

#### **Part 2:**

- Copies of *Daytime Sky Report*
- Copies of *Sunset Sky Report*
- Pencil and colored pencils



## Preparation

### Part 1:

- Read the Elementary GLOBE book *What's Up in the Atmosphere? Exploring Colors in the Sky* – either read it to the class, or have them read it in pairs or individually. The book can be downloaded from [www.globe.gov/elementaryglobe](http://www.globe.gov/elementaryglobe).
- The webstory, *Become an Atmosphere Observer*, should be read in Part 1. This short story shows students how to make sky observations. It is designed to be viewed online, but it can be downloaded as a PDF from the website: <http://science-edu.larc.nasa.gov/skycolor/>.
- Each student will need copies of both the *Daytime Sky Report* and the *Sunset Sky Report*, and they will use one each day during the observation period.

## Teacher's Notes

The color of the sky can appear different colors because of many factors. The light from the Sun looks white. But it is really made up of all the colors of the rainbow. Sunlight reaches Earth's atmosphere and is scattered by the gases and particles in the air. Blue light is scattered in all directions by the tiny molecules in the air. Blue is scattered more than other colors because it travels as shorter, smaller waves. This is why we see a blue sky most of the time. At sunrise and sunset, the Sun is lower in the sky. Its light passes through more atmosphere to reach you. Even more of the blue light is scattered, allowing the longer wavelengths like reds and yellows to pass straight through to your eyes.

The sky color is impacted by other atmospheric, or weather conditions. Small particles in the atmosphere called aerosols, can also impact the color. When there are relatively few aerosols, the sky appears clear and the color looks deep blue. As the aerosol concentration increases, all wavelengths of light are scattering giving the sky a more white color. A good time to observe this contrast of color is before

and after a cold front. A cold front typically brings about rain, which washes away the aerosols and will give the sky a more clear, deep blue appearance.

In this activity students are asked to make and record their observations. By recording their observations they will be able to discuss differences in what each person observes and track changes over time. Observations and careful recording of those observations are an important practice in science.

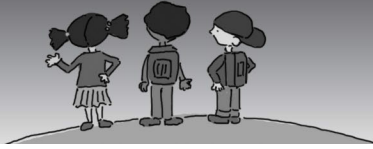
## Safety Considerations

- Make sure that students have an adult accompany them to make their sunset observations. Warn students that it is unsafe to go outside alone at night without adult supervision.
- Ensure that daytime observations are also made with the proper supervision.
- During sunset observations be sure to face toward the Sun but do not look directly at the Sun. Looking directly at the Sun can cause harm to eyes, no matter what time of day.

## What To Do and How To Do It

### Part 1: Introduction to Sky Report

1. Explain to the students that they will be going outside to observe the sky.
2. Together as a class, read through the webstory, *Become an Atmosphere Observer*. This story explains how to observe sky color and visibility.
3. Discuss safety consideration(s) with the students to make sure that they understand the importance of having an adult present when they go outside and that it is not safe to look directly at the Sun.
4. As a class go outside to make a sky observation using the *Daytime Sky Report*. Have students work with a partner to complete the observation form.
5. For homework, students should observe sunset



colors and record their observations on the *Sunset Sky Report*.

## **Part 2: Continue Sky Observations**

1. Continue daytime observations each day of the week.
2. For homework, students should observe sunset colors and record their observations on the *Sunset Sky Report*.

## **Part 3: Compare Observations**

1. On the last day of observations, have students share what they observed.
2. Have a class discussion about the following ideas:
  - Did the sky colors for the daytime differ from day to day?
  - Did the visibility vary from day to day?
  - Did the sky colors differ at sunset from day to day?
  - How did the colors differ from day to sunset?
  - Why do you think the color of the sky changes?
  - What colors were you surprised to see?

## **Adaptations for Younger and Older Students**

In the lesson students are asked to record the color of the sky during sunset. The younger students might not be able to accurately record the sky color but might be able to color in a box with a color close to what they see in the sky. In addition to recording the color of the sunset, older students could be asked to record sky visibility using the categories: unusually clear, clear, somewhat hazy, very hazy, or extremely hazy. Student observations can be displayed on the board as bar graphs or tallied by category of color or visibility.

## **Further Investigations**

- **Make a Sky Calendar:** You will need a set of colored pencils or crayons and a calendar for this

project. You can also use a calendar from a store or a calendar printed by a computer. Or you can make your own calendar using a ruler and a blank sheet of paper. Be sure to keep your sky calendar in a safe place. After you get your calendar, practice making different shades of blue on a sheet of blank paper using crayons or colored pencils. Begin your sky calendar by coloring in the first day with the color of the sky. Each day you should color the next box in the calendar with the sky color. You should do the project for at least one week. For best results, do the project for one month. This will provide you with a record of the sky color for your area. The sky calendar will reveal much about air pollution and haze—if they are present. If possible, protect your sky calendar by sliding it inside a plastic sheet protector.

- **Paint the Sky:** There is a difference in the color of the sky overhead and the color of the sky over the distant horizon. Children can learn that the horizon is the best place to look to check on the cleanliness of the sky. Have children face away from the Sun and look up into the sky. If it is a fair day with little haze, the sky overhead will be blue. Next, have the children look down to where the sky meets the horizon. Chances are the sky over the horizon will be a very different color than the sky above. If there is no air pollution, the sky over the horizon will be very light blue. Air pollution or natural haze might cause the sky to look more white than blue. Air pollution, blowing dust and smoke can all cause the sky over the horizon to appear gray, dark gray, or brown. Students can try to capture these subtle color differences using colored pencils, crayons or paints.



# Sky Observers Daytime Sky Report

Face away from the Sun and look for the deepest color of blue.

Name \_\_\_\_\_ Date \_\_\_\_\_

Time \_\_\_\_: \_\_\_\_ AM or PM (circle one)

Location \_\_\_\_\_

### Are there clouds?

- no clouds
- some clouds
- lots of clouds
- fog

### Is there precipitation?

- none
- rain
- sleet
- snow

### Is there wind?

- gentle wind
- strong wind
- no wind

Note: If there are lots of clouds, then this is not a good day to make a sky color report. Try again tomorrow!

### A drawing of my sky:

### The deepest color I see:

- deep blue
- blue
- light blue
- pale blue
- milky
- other \_\_\_\_\_

### Visibility:

- very clear
- clear
- somewhat hazy
- very hazy
- extremely hazy



## Sky Observers Sunset Sky Report

Face towards the Sun as it sets below the horizon. Look for the brightest colors in the sky.

*(Note: Don't look directly at the Sun.)*

Name \_\_\_\_\_ Date \_\_\_\_\_

Time \_\_\_\_: \_\_\_\_ AM or PM (circle one)

Location \_\_\_\_\_

### Are there clouds?

- no clouds  
 some clouds  
 lots of clouds  
 fog

### Is there precipitation?

- none  
 rain  
 sleet  
 snow

### Is there wind?

- gentle wind  
 strong wind  
 no wind

Note: If there are lots of clouds, this is not a good evening to make a sky color report. Some clouds might lead to very bright colors.

### A drawing of my sky:

### The brightest colors are:

- red  
 orange  
 yellow  
 pink  
 purple  
 blue  
 other \_\_\_\_\_

### The sky colors look:

- bright  
 dull  
 a little brown