Elementary GLOBE

Combining Literacy and Science Practices

Jessica Taylor

Elementary GLOBE was designed to help elementary teachers (i.e., grades K-4) integrate Earth system science topics into their curriculum as they teach literacy skills to students. This suite of instructional materials includes seven modules. Each module contains a science-based storybook and learning activities that support the science content addressed in the storybooks. The seven science content feature topics include:

- air quality
- climate
- clouds
- Earth as a system
- seasonal change
- soil
- surface water in rivers and streams

Through the storybooks, the students join the GLOBE Kids; Simon, Anita, and Dennis; on their adventures investigating their local environment. The complementary learning activities further explore the science content while helping students develop science and engineering practices. The materials used in these activities are inexpensive and easy to find. All of the resources have been field tested in classrooms across the United States.

Figure 1. Elementary GLOBE Storybooks

The **Sky Color Phenomena Progression** was developed by GLOBE Partners at NASA's Langley Research Center as part of the NASA Earth Science Education Collaborative project to help teachers implement one of the modules over a five-day period. This progression centers on the guiding question: *What impacts the colors of the sky?* Specific

steps to implement each activity are offered in the full progression online at: https://www.globe.gov/web/nasa-langley-research-center/resources.

Phenomena: Aerosols	Guiding Question: What impacts the colors of the sky?	
Activity	**Steps to Follow**	**NGSS Connection**
Activity 1: Become a student scientist Sky Observer by collecting sky color and visibility observations.	As a group, use a projector to review the Webstory *Become an Atmosphere Observer:* http://science-edu.larc.nasa.gov/skycolor/ Go outside to observe and record sky observations using the *Sky Observers* data collection sheet or submit observations through NASA's *GLOBE Observer* app.	**Disciplinary Core Idea:** ESS3.C Human Impacts on Earth Systems **Crosscutting Concept**: Cause and Effect **Science Practice:** Analyzing Data **NGSS Performance Expectation:** K-ESS2-1 Use and share observations of local weather conditions to describe patterns over time
Activity 2: Read the Elementary GLOBE Storybook: What's Up in the Atmosphere?	Read the Elementary GLOBE storybook: What's Up in the Atmosphere? Exploring Colors in the Sky. Teachers should use appropriate reading strategies based on reading level of the students. Book is freely available online and as an eBook: https://www.globe.gov/web/elementary-globe/overview/aerosols/story-book. *Optional:* Create a *word wall* with the students focusing on the science vocabulary and science skills.	**Disciplinary Core Idea:** ESS3.C Human Impacts on Earth Systems **Crosscutting Concept**: Cause and Effect **Science Practice**: Obtaining Information
Activity 3: Design an Aerosol Particle Collector and analyze the results.	Small groups of students can work together to design and build an aerosol particle collector using the activity Up in the Air. Once built, students will place the collectors outside and go back later to retrieve their sample and analyze what was collected.	**Disciplinary Core Idea:** ESS3.C Human Impacts on Earth Systems **Crosscutting Concept**: Cause and Effect **Science Practice**: Designing Solutions
Follow up Discussion: Talk about why NASA investigates aerosols.	Lead a group discussion about why aerosols are important to understand. NASA has a very important role in studying Earth and our atmosphere. Scientists use information from satellites, aircraft and ground-based instruments to study and measure aerosols. This helps us to understand the air we breathe. Watch this short video to learn more: "NASA's Earth Minute: My Name is Aerosols"	**Disciplinary Core Idea:** ESS3.C Human Impacts on Earth Systems **Crosscutting Concept**: Cause and Effect **Science Practice**: Asking Questions
Closure: Complete the phenomena investigation.	Have students create a Cause-Effect Chain or Cartoon Strip. Here are some suggested questions: • What are aerosols? • How do they impact the color of the sky? • What causes aerosols? • How does that affect me? • What can I do to help reduce aerosols?	**Disciplinary Core Idea:** ESS3.C Human Impacts on Earth Systems **Crosscutting Concept**: Cause and Effect **Science Practice**: Analyzing Data and Constructing Explanation **NGSS Performance Expectation:** K-ESS3-3 Communicate solutions that will reduce the impact of humans on the land, water, air, and/or other living things in the local environment

Table 1. Elementary GLOBE Aerosols One Week Guide

All of the Elementary GLOBE resources are all freely available online at https://www.globe.gov/web/elementary-globe as PDFs and the storybooks are also available as eBooks. An updated Teacher Guide (2017) is available with implementation suggestions for both younger and older elementary students and offers alignment to educational standards including Next Generation Science Standards and Common Core.

References

Elementary GLOBE Teacher Implementation Guide (2017) *An overview of the resources and background necessary to implement Elementary GLOBE in K-4 classrooms.* Boulder, CO: UCAR.

NGSS Lead States. (2013) *Next Generation Science Standards: For states, by states.* Washington, Dc: The National Academy Press.

About The Author

Jessica Taylor is Physical Scientist at NASA's Langley Research Center where she leads the Science Education team which provides training and resources to bring authentic Earth science practices and real-world data into the classroom. Jessica was a GLOBE student and is now a GLOBE Master Trainer. She has worked in formal and informal science education for over 15 years and was the Director of School Improvement for the Florida Department of Education. E-mail: jessica.e.taylor@nasa.gov.