

Earth and Human Activity/Earth Systems ■ ELEMENTARY Grades K–5

These resources can be used to build towards the following dimensions of the Next Generation Science Standards. Find these collections — and more — at the links to NASA Wavelength.org lists (at the top of each table).

ESS3. EARTH AND HUMAN ACTIVITY

K-ESS3-2. Ask questions to obtain information about the purpose of weather forecasting to prepare for, and respond to, severe weather.

3-ESS3-1. Make a claim about the merit of a design solution that reduces the impacts of a weather-related hazard.

5-ESS3-1. Obtain and combine information about ways individual communities use science ideas to protect the Earth's resources and environment.



NASA WAVELENGTH

Find this collection and more at:
<http://nasawavelength.org/list/1782>



Science and Engineering Practices

Obtaining, Evaluating, and Communicating Information.

Read grade-appropriate texts and/or use media to obtain scientific information to describe patterns in the natural world.

Obtain and combine information from books and/or other reliable media to explain phenomena or solutions to a design problem.

Disciplinary Core Ideas

ESS3.A Natural Resources. Living things need water, air, and resources from the land, and they live in places that have the things they need. Humans use natural resources for everything they do. (K-ESS3-1)

ESS3.B Natural Hazards. Some kinds of severe weather are more likely than others in a given region. Weather scientists forecast severe weather so that the communities can prepare for and respond to these events. (K-ESS3-2)

A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts. (3-ESS3-1), (4-ESS3-2)

ESS3.C Human Impacts on Earth Systems. Things that people do to live comfortably can affect the world around them. But they can make choices that reduce their impacts on the land, water, air, and other living things. (K-ESS3-3) Human activities in agriculture, industry, and everyday life have had major effects on the land, vegetation, streams, ocean, air, and even outer space. But individuals and communities are doing things to help protect Earth's resources and environments. (5-ESS3-1)

Cross Cutting Concepts

Systems and System Models.

Systems in the natural and designed world have parts that work together.

A system can be described in terms of its components and their interactions.

Cause and Effect. Events have causes that generate observable patterns.

SAMPLE INVESTIGATIONS, LESSONS & RELATED RESOURCES

Elementary GLOBE: What's Up in the Atmosphere? Exploring Colors in the Sky

<https://www.globe.gov/web/elementary-globe/overview/aerosols/story-book>



In this science-based storybook, students Anita, Simon, and Dennis want to know why the sky isn't always blue. They learn that there's a lot more than air in the atmosphere, which can affect the colors we see in the sky. Four activities accompany the book, including "Up in the Air." Working in groups, students use contact paper to collect local data on aerosols — the small particles found in the atmosphere. Students then analyze, interpret, and make predictions based on their data.

MY NASA DATA: Rock Star Precipitation

<http://nasawavelength.org/resource/nw-000-000-002-213>

In this problem-based learning activity, students assume the roles of musicians planning a world tour. Students analyze precipitation data from four cities to predict the best time of year to perform in these areas.

S'COOL Lesson: Severe Weather Planning

<http://nasawavelength.org/resource/nw-000-000-003-673>

Following classroom discussion and research, students prepare and present a product (e.g., brochure, poster, video, etc.) on the characteristics of one type of severe weather event and the appropriate preparation.

EO Kids: Fresh Water

<https://earthobservatory.nasa.gov/eokids>

EO Kids brings engaging NASA science stories from NASA's Earth Observatory to children ages 9 to 14. This issue explores



how NASA observes and measures fresh water from space. Find out why Lake Mead appears to have a bathtub ring around its shoreline and how less snow in the mountains means less drinking water for California. Explore satellite images of where fresh water is stored in and on the Earth. Discover what NASA does in the field with an update from scientists on the Olympic Mountain Experiment (OLYMPEX) campaign.

NASA Space Place: Weather Resources

<https://spaceplace.nasa.gov/search/Weather>

This website engages upper-elementary-aged children in space and Earth science through interactive games, hands-on activities, articles, and more.

ESS2. EARTH SYSTEMS

K-ESS2-1. Use and share observations of local weather conditions to describe patterns over time.

3-ESS2-1. Represent data in tables and graphical displays to describe typical weather conditions expected during a particular season.

3-ESS2-2. Obtain and combine information to describe climates in different regions of the world.

5-ESS2-1. Develop a model using an example to describe ways the geosphere, biosphere, hydrosphere, and/or atmosphere interact.



Find this collection and more at:
<http://nasawavelength.org/list/1773>



Science and Engineering Practices

Analyzing and Interpreting Data.

Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.

Represent data in tables and/or various graphical displays (bar graphs, pictographs, and/or pie charts) to reveal patterns that indicate relationships.

Engaging in Argument from Evidence.

Construct an argument with evidence to support a claim.

Developing and Using Models.

Develop a model using an example to describe a scientific principle.

Disciplinary Core Ideas

ESS2.D Weather and Climate. Weather is the combination of sunlight, wind, snow or rain, and temperature in a specific region at a particular time. People measure these conditions to describe and record the weather and to notice patterns over time. (K-ESS2-1)

Scientists record patterns of the weather across different times and areas so that they can make predictions about what kind of weather might happen next. (3-ESS2-1)

Climate describes a range of an area's typical weather conditions and the extent to which those conditions vary over years. (3-ESS2-2)

ESS2.A Earth Materials and Systems. Earth's major systems are the geosphere (solid and molten rock, soil, and sediments), the hydrosphere (water and ice), the atmosphere (air), and the biosphere (living things, including humans). These systems interact in multiple ways to affect Earth's surface materials and processes. (5-ESS2-1)

Cross Cutting Concepts

Patterns. Patterns in the natural world can be observed, used to describe phenomena, and used as evidence.

Patterns of change can be used to make predictions.

Systems and System Models.

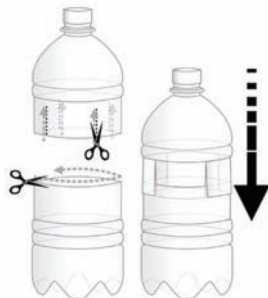
Systems in the natural and designed world have parts that work together.

SAMPLE INVESTIGATIONS, LESSONS & RELATED RESOURCES

Earth System in a Bottle

<http://nasawavelength.org/resource/nw-000-000-001-696>

Working in pairs, students will create experimental conditions in terrariums in order to study what plants need to live. Variables to study include the presence or absence of soil, water, and sunlight.



Students will record the growth of radish plants as well as observations of the water cycle in their terrariums. At the conclusion of their experiments, students will share their results with the class and discuss how water, Earth materials, and air are all necessary to support living things.

MY NASA DATA: Basic Line Plots

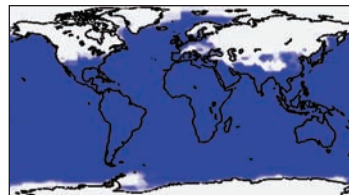
<http://nasawavelength.org/resource/nw-000-000-002-931>

Students analyze NASA wind speed climate data using a line plot graph. The lesson includes guiding questions to help students

understand the basic functions of a line plot. It serves as an introduction to analyzing data and climate data in general, which should be further explored using different data sets (temperature, precipitation) and different locations. It also makes a math/science connection, helping students understand the relationship between measurement, data collection, and graphing.

MY NASA DATA: Comparison of Snow Cover on Different Continents

<http://nasawavelength.org/resource/nw-000-000-002-184>



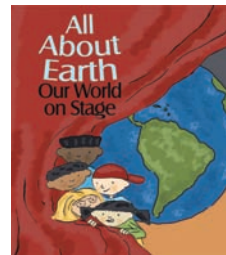
In this data activity, students create snow cover maps to determine an estimated snow cover by continent.

Elementary GLOBE

<https://www.globe.gov/web/elementary-globe>

This instructional unit is designed to introduce elementary students to the study of Earth system science and includes:

1) science-based storybooks designed to



introduce students to key concepts in climate, water, soil, clouds, seasons, aerosols, and Earth system

studies; and 2) classroom learning activities complementing the science content covered in each storybook.

Bringing the Universe to America's Classrooms: Weather and Climate Modules

<http://pbslearningmedia.org/universe>

New instructional modules contain digital media that address the content and practices in the K-12 *Framework for Science Education* and feature innovative media formats — including satellite images, data visualizations, and videos drawn from WGBH's signature programs like *NOVA* and *PEEP & the Big Wide World*. Resources have been designed to be accessible for diverse learners and include support materials, such as background essays, teaching tips, and student handouts.



PBS LearningMedia