

Weather, Climate, and Data STEM Resources

The information below has been compiled by the North Carolina Institute for Climate Studies (NCICS) outreach and engagement team. This is an extensive, though not necessarily comprehensive, list of tools and resources relevant to K-12 educators interested in weather and climate-related information and activities. Websites have been labeled below according to approximate grade level targets, though not all are age/grade specific, with some geared toward providing climate-related information for educators, and others including grade-specific activities. For outreach enquiries related to specific events in the Western North Carolina area, please contact: cics-outreach@cicsnc.org.

Table of Contents

1. Climate Interactive Mitigation Scenario Tools [9-12]	2
2. Climate Literacy and Energy Awareness Network (CLEAN) [K-12]	2
3. Climate Literacy: The Essential Principles of Climate Science [9-12]	2
4. Elementary Globe [K-4]	3
5. JPL Education: Climate Change Lessons [K-12]	3
6. My NASA Data [K-12]	3
7. NASA Climate Kids [K-8]	4
8. NOAA Resources for the Classroom [K-12]	4
9. National Climate Assessment (NCA) Teaching Resources [K-12]	4
10. North Carolina Climate Office: Climate Education Modules [K-12]	5
11. The Teacher Friendly Guide to Climate Change [9-12]	5
12. UCAR Center for Science Education [K-12]	5

1. Climate Interactive Mitigation Scenario Tools

<https://www.climateinteractive.org/tools/>

Climate Interactive's Tools site has several different climate tools, including a few for evaluating mitigation scenarios to see the impacts on global temperature change. C-ROADs is a simplified version, EN-Roads is a much more complex tool that includes specific energy generation policies, etc.

2. Climate Literacy and Energy Awareness Network (CLEAN)

https://cleanet.org/clean/literacy/teach_guidance/index.html

Why use CLEAN to teach about climate science and energy?

The Climate Literacy and Energy Awareness Network ([CLEAN](#)) collection is a peer-reviewed, comprehensive source of high-quality, NGSS-aligned educational resources for grades K-16.

Educators can quickly and easily search the CLEAN [collection](#) by topic, grade level, and resource type.

What are the Next Generation Science Standards (NGSS)?

The [NGSS](#) three-dimensional instructional model challenges science educators to rethink our lesson and unit planning process by the inclusion of the Science and Engineering Practices (SEPs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs), as they bundle Performance Expectations (PEs).

3. Climate Literacy: The Essential Principles of Climate Science

https://downloads.globalchange.gov/Literacy/climate_literacy_highres_english.pdf

Climate Literacy: The Essential Principles of Climate Science presents information that is deemed important for individuals and communities to know and understand about Earth's climate, impacts of climate change, and approaches to adaptation or mitigation. Principles in the guide can serve as discussion starters or launching points for scientific inquiry. The guide aims to promote greater climate science literacy by providing this educational framework of principles and concepts. The guide can also serve educators who teach climate science as a way to meet content standards in their science curricula.

Development of the guide began at a workshop sponsored by the National Oceanic and Atmospheric Administration (NOAA) and the American Association for the Advancement of Science (AAAS). Multiple science agencies, nongovernmental organizations, and numerous individuals also contributed through extensive review and comment periods. discussion at the National Science

Foundation and NOAA-sponsored atmospheric Sciences and climate Literacy workshop contributed substantially to the refinement of the document.

4. Elementary Globe

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

Elementary GLOBE is designed to introduce K-4 students to the study of Earth system science, including topics on [Air Quality](#), [Climate](#), [Clouds](#), [Earth Systems](#), [Seasons](#), [Soils](#), and [Water](#).

Each module of Elementary GLOBE includes:

- A science-based fictional storybook (available as a free downloadable PDF or eBook) in which kids explore an aspect of the Earth system using their science skills.
- Three learning activities that further explore the science content while helping students develop science and engineering practices.
- Teacher's notes and a glossary to give educators basic science background information pertaining to each module topic.

5. JPL Education: Climate Change Lessons

<https://www.jpl.nasa.gov/edu/teach/tag/search/Climate+Change>

This collection of climate change lessons and activities for grades K-12 is aligned with Next Generation Science and Common Core Math Standards and incorporates NASA missions and science along with current events and research.

6. My NASA Data

<https://mynasadata.larc.nasa.gov/>

MY NASA DATA (MND)'s tools allow anyone to access real NASA Earth science data. Through the use of MND's Live Access Server (LAS) data viewer, you can create a variety of charts, plots, and graphs to explore the Earth system and answer research questions.

MY NASA DATA is also ideal for the classroom, offering a large number of lesson plans, tools, and resources. We're here to bring NASA's Earth science mission into the hands of teachers, students, researchers and citizen scientists.

7. NASA Climate Kids

<https://climatekids.nasa.gov/>

NASA's Climate Kids website brings the exciting science of climate change and sustainability to life, providing clear explanations for the big questions in climate science. Targeting upper-elementary-aged children, the site includes interactive games, hands-on activities, and engaging articles that make climate science accessible and fun. With a special section for educators, Climate Kids is great for parents and teachers as well.

8. NOAA Resources for the Classroom

<http://www.noaa.gov/stories/teachers-six-noaa-tools-for-back-to-school>

NOAA has many educational resources to choose from. Here's a round-up of six digital resources and social media channels you can explore online to bring Earth science to life in your classroom.

1. Use real data in the classroom with our redesigned, ready-to-use website, [NOAA's Data in the Classroom](#).
2. Learn through videos with [NOAA's Ocean Today Every Full Moon](#) video series.
3. Incorporate climate-smart classroom resources with the [#Teach4Climate](#) social media campaign.
4. Teach science and safety with the National Weather Service mascot, [Owlie Skywarn](#).
5. Use coastal information and training resources in your classroom with [NOAA's Digital Coast](#).
6. Go on a virtual field trip with NOAA's new visualization tools, such as [Science On a Sphere® Explorer Lite 2.0](#).

These online resources and campaigns highlight just a handful of NOAA's many [education programs](#). You can also check out our [educator professional development](#) opportunities.

9. National Climate Assessment (NCA) Teaching Resources

<https://www.climate.gov/teaching/national-climate-assessment-resources-educators/2014-national-climate-assessment-resources>

The National Climate Assessment offers a wealth of actionable science about the causes, effects, risks and possible responses to human-caused climate change. NOAA, the [NCAnet](#)

[Education Affinity Group](#), and members of the [CLEAN Network](#) have developed a series of guides for educators that focus on the regional chapters of the Assessment Report, helping to unpack the key messages of each region and point to related, high-quality online resources.

10. North Carolina Climate Office: Climate Education Modules

<http://climate.ncsu.edu/edu/home/>

This website is designed to help educators understand climate and weather concepts and to be able to incorporate the learning material from this site into their course curriculum using examples as aids for learning. It is also useful for anyone else who wants a basic understanding of weather and climate, especially in the southeastern United States.

11. The Teacher Friendly Guide to Climate Change

<https://teachclimatescience.wordpress.com/>

This book includes both the basics of climate change science and perspectives on teaching a subject that has become socially and politically polarized. The focus audience is high school Earth science and environmental science teachers, and it is written with an eye toward the kind of information and graphics that a secondary school teacher might need in the classroom. Print copies are available for purchase [here](#) and a [PDF version](#) is available above as a free download.

12. UCAR Center for Science Education

<https://scied.ucar.edu/activities>

Collection of activities and toolboxes for use in the classroom. Activities are related to: weather, climate, sun-earth, atmosphere, and more.

