Southwestern Community College
EXPLORE YOUR PATH TO SUCCESS

Smoky Mountains STEM Collaborative

NASA Resources for EES classes

For NC EES. Obj. EEn.1.1 - Explain the Earth's role as a body in space.

Lesson Plan: Mars Education modeling - These two lessons focus on the size, scale and relative distance relationships of the planets within our solar system, affording your students the opportunity to create a conceptual model of the solar system that can later be applied to the dynamic processes found on our planet and many others.
http://marsed.asu.edu/stem-lessons-scale-modeling

Lesson Plan: Seasonal Science: Building Claims from Evidence - Students will analyze surface temperature and solar radiation data to construct explanations about the relationship of seasons and temperature to the amount of solar energy received on Earth's surface.
https://mynasadata.larc.nasa.gov/lesson-plans/seasonal-science-building-claims-evidence

Lesson Plan: Why Is There a Tidal Bulge Opposite the Moon? - Students make a model using a spring and then analyze data to understand tides and gravitation and how gravity works across astronomical distances. https://pumas.jpl.nasa.gov/files/01_25_11_1.pdf

Lesson Plan: Comparing Temperature & Solar Radiation for Common Latitudes
Examine surface temperature and solar radiation received at locations found near similar latitudes using NASA Data.
https://mynasadata.larc.nasa.gov/lesson-plans/comparing-temperature-solar-radiation-common-latitudes

Videos:

- **Launchpad: Night Shining Clouds** - Have you ever seen noctilucent or night-shining clouds in the summer sky? Explore the layers of our atmosphere. Find out why NASA is interested in how these glowing clouds are formed and what they tell us about Earth.
  https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-night-shining-clouds
- **Launchpad: Solar Eclipses -** Find out about the unique geometry and the distances and sizes of the sun and moon as seen from Earth that allow us to witness the sun's corona or actually be in the path of totality.
  https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-solar-eclipses

- Launchpad: Clouds and Earth's Radiation Budget - Explore clouds and find out how they affect Earth's radiation budget. https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-clouds-and-earths-radiation-budget

For NC EES. Obj. EEn.2.4 - Evaluate how humans use water.

Lesson Plan: Water Filtration System - This lesson challenges students to create and test a water filtering system. The activities in this lesson focus on water recovery and management. https://www.nasa.gov/offices/education/programs/national/summer/education_resources/engineering_grades7-9/E_water-filtration.html

Articles:

- **Raindrop Tales: GPM Meets Mizu-Chan** - This 12-page educational comic book introduces readers to the Global Precipitation Measurement (GPM) mission. Using the Japanese anime art style, the comic book explains the satellite technology and the mission goals and applications. https://pmm.nasa.gov/education/comics

- **Study Maps Hidden Water Pollution in U.S. Coastal Areas -** https://www.nasa.gov/feature/jpl/study-maps-hidden-water-pollution-in-us-coastal-areas

For NC EES. Obj. EEn.2.5 - Understand the structure of and processes within our atmosphere.

Lesson Plan: Graphing Stratospheric Ozone - This lesson includes a simple "how-to" graphing example followed by other more sophisticated examples of graphing using NASA images and images from the Neumayer Antarctic Station. http://cse.ssl.berkeley.edu/SegwayEd/lessons/ozone/introduction.html and http://cse.ssl.berkeley.edu/SegwayEd/abtozone.html

Lesson Plan: Rocket To The Aurora - A tutorial and web-based lesson lead to an open-ended laboratory activity is useful in demonstrating how solar wind particles are deflected by the Earth's magnetosphere. http://sprg.ssl.berkeley.edu/aurora_rocket/education/welcome.html

Videos:

- **Launchpad: Aurora Lights: Why They Exist and What Causes Them** https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-aurora-lights-why-they-exist-and-what-causes-them

For NC EES. Obj. EEn.2.6 - Analyze patterns of global climate change over time.

Lesson Plan: Glacial Retreat: Quantifying Changes in Glacier Cover Over Time - In this activity, you will use satellite images from the NASA Landsat team to quantify changes in glacier cover over time. This lesson utilizes change pair images of Bear Glacier in Kenai Fjords National Park, located on the southeastern portion of Alaska's Kenai (pronounced: Key-nigh) Peninsula, bordering the Gulf of Alaska.
https://mynasadata.larc.nasa.gov/lesson-plans/glacial-retreat-quantifying-changes-glacier-cover-over-time

Lesson Plan: Climate Change in My Backyard - This unit consists of five activities, all of which focus on the response of plant life-cycle events to climate change.
https://www.chicagobotanic.org/nasa/Grades_10-12_Activity_Guide

Lesson Plan: Sea Surface Salinity from Space - This collection of 30 activities follows the Aquarius Mission and is designed to demonstrate how monitoring changes in salinity patterns can help everyone better understand connections between the water cycle, ocean circulation, and climate.
https://aquarius.umaine.edu/cgi/ed_activities.htm

Videos:

- **Oceans of Climate Change -** Eighty to 90 percent of the heat from global warming is going into Earth's oceans. https://www.jpl.nasa.gov/video/details.php?id=827
- **Launchpad: NASA's History of Winter Program** - What can measuring the density of snow and diagramming snowflakes teach us about the cryosphere and Earth's global climate system?
  https://nasaeclips.arc.nasa.gov/video/launchpad/launchpad-nasas-history-of-winter-program

OTHER RESOURCES

VISIBLE EARTH A catalog of NASA images and animations of our home planet sorted by topics.
https://visibleearth.nasa.gov/

Introduction: Earth System Science - This chapter provides an overview of the science of studying the Earth system, with a focus on understanding the connections among phenomena that can be traced through the energy, hydrological and biogeochemical cycles, on a range of time and spatial scales.
https://www.globe.gov/documents/356823/321ebbf0-ef1b-419e-9a19-cbea1aceffdd

Precipitation Education - This is a collection of all of the original videos and educational resources that have been developed by the Global Precipitation Measurement staff.
https://pmm.nasa.gov/education/gpm-original-resources

Inquiry Strategies to use with ESSEA modules - The NASA GCCE ESSEA modules are designed for teachers who are taking ESSEA courses. Teachers can also use the GCCE ESSEA course modules and adapt it for middle and high school students by using this guide.
https://esseacourses.strategies.org/inquiry.html

Earth Observatory - The Earth Observatory's mission is to share with the public the images, stories, and discoveries about the environment, Earth systems, and climate that emerge from NASA research, including its satellite missions, in-the-field research, and models. https://earthobservatory.nasa.gov/IOTD/