

MIDDLE SCHOOL SAMPLER Find more at www.smdeponews.org
ASTRONOMY & PHYSICS
Ancient Eyes Looked to the Skies: Sunwatchers of the Southwest

http://bit.ly/MS12_sunwatchers

These classroom activities are designed to engage students in real scientific data-taking and analysis, while experiencing how ancient cultures, particularly in the American Southwest, tracked natural cycles—especially the sun.

Ceres and Pluto: Dwarf Planets as a New Way of Thinking about an Old Solar System

http://bit.ly/MS12_cerespluto

This activity, inspired by publicity generated by the International Astronomical Union in 2006, engages students in considering the definitions of “planet,” “dwarf planet” and “asteroid,” as well as the relationship between language and our understanding of the solar system.


Cindi in Space

http://bit.ly/MS12_cindi

This comic book explains the science of the upper atmosphere, and how the ionosphere affects communication

and navigation on Earth. Accompanied by her pet robot dogs TEKS and TAKS, Cindi, an android space girl, guides students through concepts such as layers of the atmosphere, atoms, and how radio signals from satellites are bent and distorted by “space weather.”

Comet on a Stick

http://bit.ly/MS12_cometstick

This activity allows students to emulate a process that scientists and engineers follow on all NASA missions as they design and build a model of a comet. Younger students

will learn the basic characteristics of a comet. Older students will practice evaluation and improvement of their comet model.

Comparing Comets

http://1.usa.gov/MS12_compcomet

In this lesson, students use real-world science imagery and data to compare and contrast the nucleus of two comets, while listening to audio files of NASA scientists and middle school students conducting the activity.

Dawn: Find a Meteorite

http://bit.ly/MS12_findmeteorite

This online activity introduces the importance of meteorites to the understanding of the origin of the solar system.

Exploring Magnetism

http://bit.ly/MS12_expmagnetism

These activities allow students to learn about the important role magnetic fields play in space science and in many NASA solar missions.

Getting Dirty on Mars

http://bit.ly/MS12_dirtyonmars

Based on NASA's Phoenix Mars Lander, students simulate what it is like to collect and characterize soil samples.

International Observe the Moon Night (IOMN)

http://bit.ly/MS12_IOMN

Host your own or join scientists, educators, students and moon enthusiasts around the globe on 9/22/2012 and instill a sense of wonderment and curiosity in your students about Earth's nearest neighbor. Lunar resources and information are available online, as well as a downloadable certificate of participation.


Newton's Laws of Motion

This set of four posters depicts and explains Newton's laws of motion and gravitation. Classroom activities, created to complement each other as an overall unit, accompany each poster.



- **First Law:** http://bit.ly/MS12_newton1
- **Second Law:** http://bit.ly/MS12_newton2
- **Third Law:** http://bit.ly/MS12_Newton3
- **Law of Gravitation:** http://bit.ly/MS12_newtongrav

Space Weather Media Viewer

http://1.usa.gov/MS12_spaceweather

This viewer presents near-real-time data, downloadable images of earthly and solar phenomena, and classroom resources. Also included are broadcast-quality video interviews with NASA scientists.


Sun-Earth Day

http://1.usa.gov/MS12_sunearthday

This series of programs and events all year culminate with a celebration on or around the spring equinox. An annual theme related to sun-Earth science highlights scientists, their missions and research. Sun-Earth Day is an exciting way to engage K–12 students in space science activities, demonstrations and interactions with NASA's space scientists.

Telescopes from the Ground Up

http://bit.ly/MS12_telescopes

This online timeline allows students to explore the history of telescopes, from Galileo to NASA's Great Observatories.

Transit Tracks

http://bit.ly/MS12_transittrack

This resource allows students to use light curve data from the Kepler spacecraft to look for evidence of planets orbiting other stars.

CLIMATE & WEATHER

GLOBE Student Climate Research Campaign (SCRC)

http://1.usa.gov/NSTA12_scrc



This worldwide effort seeks to engage youth in understanding climate through research of locally relevant climate issues. It includes foundational activities, intensive observing periods and research investigations. The campaign launched fall 2011 and concludes summer 2013.

Hurricane Katrina

http://bit.ly/MS12_katrina

This problem-based learning activity uses Hurricane Katrina as the context for students to conduct an Earth system analysis to answer the following questions: Are recent increases in the number and strength of hurricanes a result of an increased greenhouse effect and a warmer climate? Or are they the result of a natural cycle?

Meteorology: An Educator's Resource for Inquiry-Based Learning

http://1.usa.gov/MS12_meteorology

This resource includes inquiry-based activities to supplement existing courses, including *Weather and Climate, Surface Color and Effect of Temperature Change, Tornado in a Box*, and more.



S'COOL—Students' Cloud Observations On-Line

http://bit.ly/NSTA12_scool

This project involves students (ages 5–20+) in real science, making and reporting ground truth observations of clouds to assist in the validation of NASA's CERES satellite instruments. S'COOL observations contribute to the study of clouds and their role in our weather and climate.

EARTH SCIENCE

Landsat Education Activities

http://1.usa.gov/MS12_landsat

This site includes classroom activities such as *Finding Impact Craters with Landsat* and *Annotating Change in Satellite Images*.

MY NASA DATA

http://bit.ly/NSTA12_mynasadata

This portal allows students to investigate microsets of NASA Earth science satellite data,

including atmosphere, biosphere, ice, ocean and land surface data.



Lesson plans, computer tools

and an Earth science glossary are available.

Examples of lessons for middle school teaching include *Hurricanes as Heat Engines* and

Does Cloud Type Affect Rainfall?

NASA's Earth Observatory

http://1.usa.gov/NSTA12_eobs

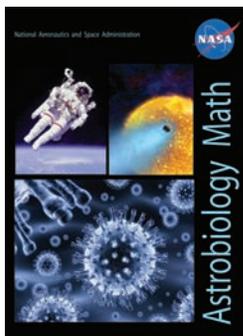
This site features images, stories and discoveries from NASA Earth science research. Check out the section on **Natural Hazards** • http://1.usa.gov/NSTA12_nathazards • where you can browse images and subscribe to email updates on a wide variety of natural hazards (fires, severe storms, volcanoes, etc.).

MATHEMATICS

Inverse Square Law of Light

http://1.usa.gov/NSTA12_lawoflight

This activity enables students to measure the relationship between distance and brightness in order to understand how astronomers determine the distances to stars and faraway galaxies.



Space Math @ NASA

http://bit.ly/NSTA12_spacemath

These collections of problems show authentic mathematical applications to a wide range of space and Earth

science topics. Books appropriate for middle school teaching include: *Astrobiology Math*, which introduces topics in the search for life beyond Earth, such as evolution, habitability and Drake's equation; *Earth Math*, which involves mathematics related to climate change; and *Electromagnetic Math*, which allows students to explore the mathematics behind electromagnetic energy, including the properties of waves, wavelength, frequency and Doppler shift.

Want more?

This is just a snapshot of the hundreds of NASA Earth and space science resources available online.

Visit: www.smdeponews.org for resources, upcoming workshops, events and much more!

MULTIMEDIA

NASA Apps

http://1.usa.gov/NSTA12_apps

Download apps for smart phones and tablets, including the **NASA App**, which includes information on NASA's



Earth and space science satellite missions, Astronomy Picture of the Day, video

clips on current events, NASA Twitter feeds and Third Rock Radio.

NASA eClips

http://1.usa.gov/NSTA12_clips

These short, relevant educational video segments inspire and engage students, helping them see real-world connections to NASA science.



NASA ScienceCasts

http://1.usa.gov/NSTA12_scicasts

These short videos cover fun, interesting and unusual science topics related to NASA's science missions. Subscribe to the free ScienceCasts on YouTube, iTunes, and Vimeo, and follow on Twitter.



Scientific Visualization Studio (SVS)

http://1.usa.gov/NSTA12_svs

Located at the NASA Goddard Space Flight Center, SVS works closely with scientists to create data visualization products that promote a greater understanding of NASA Earth and space science. Visualizations are browsable by theme, as well as searchable by keyword, mission, instrument, etc.