MIDDLE SCHOOL SAMPLER ■ Find more at *www.smdeponews.org*

middle school

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_ceresplutо
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.

NASA Middle School Sampler

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

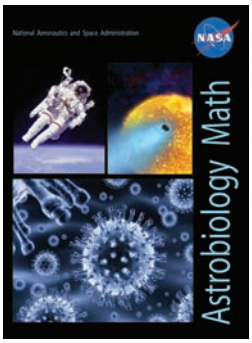
Landsat Education Activities
http://1.usa.gov/MS12_landsat
This site includes classroom activities such as ***Finding Impact Craters with Landsat*** and ***Annotating Change in Satellite Images.***

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.