



The 2016 White House Science Fair

Educational Toolkit

Tune in on April 13:

Watch the Livestream:

Click [HERE](#) to tune in on April 13th between 1:00 PM and 3:00 PM ET

Participate on Social Media:

Participate online using the hashtag **#WHScienceFair**

On April 13th, the White House is hosting the 6th White House Science Fair. This year's White House Science Fair will highlight the ingenuity and entrepreneurship of the next generation of scientists, engineers, mathematicians, and innovators. Students attending this year's Science Fair are tackling some of our Nation's greatest challenges - from combating climate change, to uncovering new ways to fight cancer, to discovering ways to reach farther beyond our atmosphere as a part of the Mars generation.

The day's activities won't just be limited to the White House, however. YOU can join a community of scientists, innovators, students, and educators by participating in your own scientific explorations with a group of students in your community or classroom. The resources in this toolkit are designed to provide ideas and examples of different ways to get started.

Get involved:

- Think of a challenge or problem in your community or school. How could science, technology, engineering or math be used to help address this issue? Share your solutions with [#WHScienceFair](#) on social media.
- Host a science night for parents and students at your school and share favorite experiments from each grade level.
- Use the hashtag [#WHScienceFair](#) to share your favorite science experiment on social media. Remember to follow safety rules for social media.
- Get to know scientists by visiting a science museum virtually or in person, or by inviting a scientist to visit your school.

Plan science activities for you or your classroom:

The following activities include an array of web-based resources for classroom (or individual) active learning activities in a variety of STEM areas. Check out the below links to get started, or explore the option of creating your own experiment. Share your discoveries with us on social media using the guidance above!

Kindergarten – Grade 3

Build Your Own Soda Bottle Magnetometer

<http://image.gsfc.nasa.gov/poetry/workbook/magnet.html>

In this activity, students have the opportunity to build and operate a simple magnetometer using a soda bottle and a bar magnet. They can use it to monitor changes in Earth's magnetic field, and to study magnetic storms and investigate their properties in time and space by making measurements and performing simple statistical analysis.



Image source: <http://image.gsfc.nasa.gov/poetry/workbook/magnet.html>

“What’s Your Problem?” A Look at the Environment in Your Own Backyard

http://www.smithsonianeducation.org/educators/lesson_plans/deer/index.html

For inspiration for students to take on their own environmental challenge, dive into this issue of *Smithsonian in Your Classroom*, which details the explorations of one Colorado classroom in discovering an exploding population of mule deer in their local community. In the first lesson plan, students begin their research by interviewing people who live in the community. Students ask about the state of the local environment—and how it has changed over the years—before deciding on a problem to tackle. The second lesson recounts the steps of the Colorado project, which might serve as a loose outline for a class project.

Getting Dirty on Mars: Exploring Soil on the Earth and Beyond

http://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Getting_Dirty_on_Mars.html#.Vv6-0c9rjX4

The Mars Phoenix lander is digging through the soil of the Red Planet and collecting samples. In this activity, students work in cooperative groups to collect soil samples from the field, just as NASA's robotic Phoenix Mars Mission collects samples on the Red Planet. Through this exercise, students gain an understanding of the properties of soils and examine soils for their ability to sustain organisms. Students measure the soil moisture content, compare soil colors, look for biomarkers, and measure pH to make their comparisons.

Grades 4 – 8

Ball Launcher Experiment

http://www.aeronautics.nasa.gov/pdf/ball_launcher_5-12.pdf

The Ball Launcher lesson is a hands-on activity designed to introduce students to the concept of a parabolic arc. By simply throwing a ball, students begin to learn how NASA flies parabolic arcs to create periods of reduced gravity with the C-9B aircraft in the Reduced Gravity Research Program. In addition, students measure their reaction time by using a meter stick.

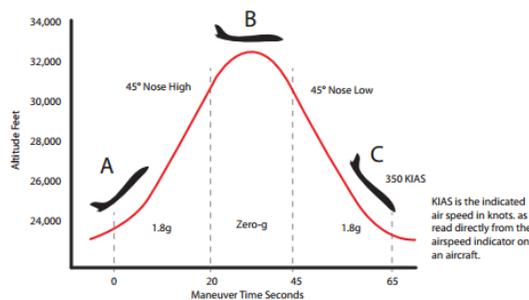


Image source: http://www.aeronautics.nasa.gov/pdf/ball_launcher_5-12.pdf

3..2..1..PUFF!

<https://nsdl.oercommons.org/courses/3-2-1-puff>

In this activity developed by NASA, students learn about rocket stability as they construct and fly small paper rockets. Participants construct small indoor paper rockets, determine their flight stability, and launch them by blowing air through a drinking straw.

Studying the Effect of Ocean Acidification on Marine Osteoporosis

http://www.cisanctuary.org/ocean-acidification/PDFs-WorkshopPage/Hands_on_activities/Marine_Osteoporosis/marineos.pdf

In this lesson students explore the effects of acidic oceans on certain marine organisms, in the ocean food web, and to humans. Students conduct a science experiment using the scientific method to see the effects of increased acidity on certain species. They also investigate the causes for increased ocean acidity and discuss ways to minimize the impact as an individual and as a society.

Exploring the Universe: An Introduction

http://www.smithsonianeducation.org/educators/lesson_plans/universe/index.html

Take on an exploration of the universe with this introduction to astronomy—a science that asks fundamental questions about the universe. *How big and how far away are the planets and stars? How did they form and when? How do they move and why?* Finding answers to those questions has been the highest adventure of the human mind, and yet the questions, in essence, are those of any child looking into the sky. The lessons in this issue of *Smithsonian in Your Classroom* address the questions, therefore, by first asking the students.



Image source: http://www.smithsonianeducation.org/educators/lesson_plans/universe/smithsonian_siyc_spring2010.pdf

Grades 9 – 12

Exploring Ocean Acidification Using Real Data from NOAA

<http://dataintheclassroom.noaa.gov/SitePages/oa/index#.Vv1UjIvriUk>

This resource contains five activities designed for grades 10-12 that incorporate real data from NOAA. The activities are organized as a pathway with five levels of increasing sophistication. Learn more about NOAA's data services here: <http://www.nnvl.noaa.gov/view/>.

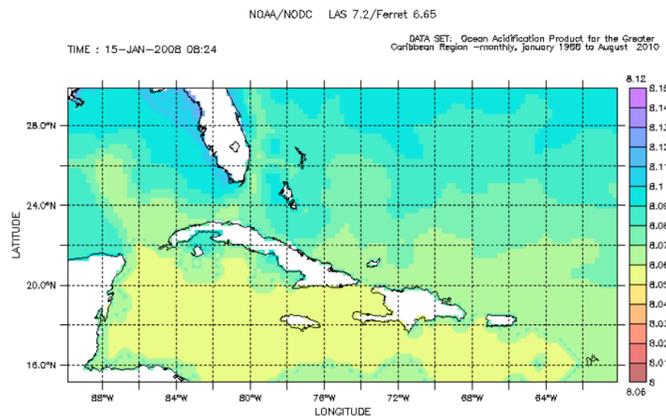


Image source: <http://dataintheclassroom.noaa.gov/Documents/Ocean%20Acidification%20Teacher%20Guide.pdf>

Learning About Nuclear Energy and Radiation

<http://www.nrc.gov/reading-rm/basic-ref/students/for-educators/classroom-activity.html?panel=2#panel2>

We live in a radioactive world and always have. Have you ever wondered how to identify the “footprints” of radiation? What about how to calculate your own average dose of radiation (measured in millirems)? These classroom activities and resources from the United States Nuclear Regulatory Commission will enable students to explore these questions, and many more.



Image source: <http://www.nrc.gov/reading-rm/basic-ref/students/for-educators/classroom-activity.html?panel=2#panel2>

Prehistoric Climate Change – And Why It Matters Today

http://www.smithsonianeducation.org/educators/lesson_plans/climate_change/index.html

In this lesson, students work as a team of paleontologists studying a time of rapid global warming 55 million years ago. By examining fossils of leaves from various tree species, and by incorporating the findings into a mathematical formula, the students are able to tell average annual temperatures during this prehistoric time.



Image source: http://www.smithsonianeducation.org/educators/lesson_plans/climate_change/smithsonian_siyc_fall2009.pdf

Discovering Cell Biology

https://geneed.nlm.nih.gov/topic_subtopic.php?tid=1

The cell is the unit of all known living organisms. Cell biology is a field of science that studies cells, including their physiology, their structure, and their life cycle. Fundamentals of cell biology include the processes of mitosis and meiosis. Check out these web resources to dive into the world of cell biology—including animations for concept illustration, interactive tutorials, games, and other learning resources.