



White House Astronomy Night – *Get Involved!*

On October 19th, the White House is hosting the second ever Astronomy Night. We've invited students and educators to the South Lawn of the White House to stargaze with us and to participate in other hands-on activities.

But the night's activity won't be limited to the White House. YOU can join a community of scientists, star gazers, and educators by hosting or attending your own Astronomy Night and following along with the events in Washington.

TUNE IN ON OCTOBER 19:

Livestream:

Click [HERE](#) to tune in on October 19th between 7:00 PM and 10:00 PM ET

Social Media:

Participate online using the hashtag #AstronomyNight

ASK A SCIENTIST YOUR QUESTION ABOUT SPACE:

On Monday, October 19th, from **8:45 pm – 9:45 pm ET**, space experts and special guests at Astronomy Night will be on Twitter to answer YOUR questions about space! Follow **@WhiteHouseOSTP** and use **#AstronomyNight** to ask questions and participate in the conversation!

FIND A LOCAL EVENT:

Students and educators from around the country will join us in making this a nationwide night of astronomy. Colleges and universities, planetariums, museums, amateur astronomy clubs, and other interested organizations all have the opportunity to participate by hosting their own astronomy nights (or other programs) for their local communities on that same evening.

Find an event in your area [HERE!](#)

Planning your own Astronomy Night event? Read on for more information and resources!

RESOURCES FOR SATELLITE EVENTS:

Want to host your own event, but not sure what to do? Check out some of the tips and resources below!

Tune In to the Live Stream from the South Lawn: Check out the live stream [here](#) between 7 PM and 10 PM on October 19th to view some of the events on the South Lawn. We're providing a schedule of events so that you can plan the time to tune in (all times Eastern).

In a different time zone and don't want to tune in until it gets dark in your area? Be sure to open up the livestream at 7 pm Eastern and keep your browser window open. You'll be able to rewind and fast forward whenever you're ready to watch!

7:00 PM – 7:30 PM	Check out the birds-eye view from White House Astronomy Night
7:35 PM – 8:05 PM	President Obama delivers remarks and participates in Astronomy Night activities
8:45 PM – 9:15 PM	Presentations from astronauts, educators, and more!
9:15 PM – 9:45 PM	Q&A with the stars of Mythbusters

Check Out Some Tips from the National Science Foundation: Not an expert astronomer? No problem! Check out [these](#) useful tips from some of the experts at the National Science Foundation and prepare for an exciting night of stargazing!

Look the Part with an Official 2015 White House Astronomy Night Poster: You can download and print these unique posters to distribute at your event. [Check out page 3 of this document to print your own!](#)

Distribute Collectable Space Trading Cards: The National Science Foundation has also created a set of astronomy-themed trading cards with fun facts about planets, stars, and other objects in the night sky. [Print out pages 4 – 7 and try to spot all of the objects!](#)

Create Your Own Mars Habitat Prototype: NASA has partnered with Destination Imagination to create an activity that lets you and your Astronomy Night guests become NASA engineers for the night. With some paper, popsicle sticks, straws, pipe cleaners, and a little bit of imagination, students of all ages can figure out the best way to sustain life on Mars. [Check out pages 8 – 12 for instructions!](#)

Congratulate Your Participants: The Night Sky Network, with support from NASA, has created a certificate honoring you and your guests' for being part of the Astronomy Night events taking place around the country. Click [here](#) to personalize it and share with your attendees!




WHITE HOUSE
ASTRONOMY
NIGHT


2015




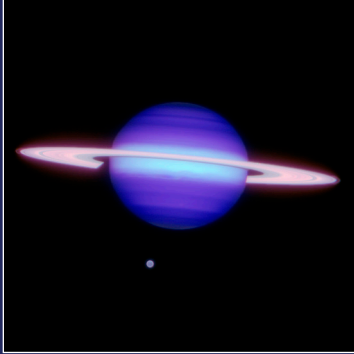
SEE THE UNIVERSE
WAITING TO BE DISCOVERED
ABOVE EVERY MONUMENT, PARK AND HOME



ASTRONOMY NIGHT
AT THE WHITE HOUSE
WITH YOUR NATIONAL OBSERVATORIES
#NSFastronomy
19 OCTOBER 2015





Saturn




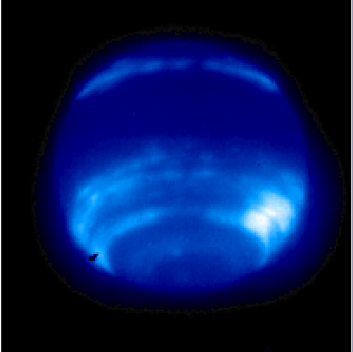
The WHITE HOUSE
ASTRONOMY NIGHT
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Double Cluster in Perseus





The WHITE HOUSE
ASTRONOMY NIGHT
2015

Neptune




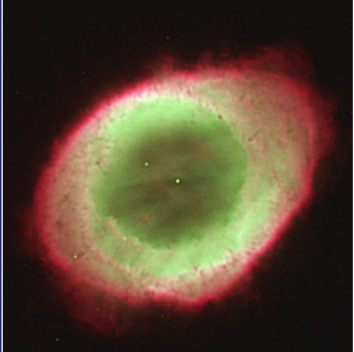
The WHITE HOUSE
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The Moon



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M57 Ring Nebula



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Neptune

Neptune is the furthest planet from the Sun in our solar system. NSF-funded researchers investigate Neptune's atmosphere, which is the most active in the solar system, causing tumultuous winds and weather. *Did you know Neptune has the strongest winds in the solar system – 2100 km/hour, almost twice the speed of sound?*



National Science Foundation

Credit: Center for Adaptive Optics, UC Santa Cruz

M57 Ring Nebula

The Ring Nebula is a spherical shell of glowing gas surrounding a white dwarf star. Although this shell formed just 7,000 years ago – the blink of an eye in astronomical time – it and the white dwarf originated from a dying star billions of years old. Bright planetary nebulae like M57 are easy to view, and NSF-funded astronomers use them to test new astrophysical theories. *Did you know a spoonful of white dwarf star material on Earth would weigh as much as an elephant?*



National Science Foundation

Credit: C.F. Claver/WITN/NOAO/NSF

The Moon

The Moon is Earth's nearest celestial neighbor, and scientists believe it was created when a Mars-sized rock smashed into Earth during the solar systems formation ~4.5 billion years ago. NSF-funded scientists study moon rocks to uncover what kind of objects may have impacted our own planet. *Did you know the Moon is moving away from Earth about 1.5 inches per year?*



National Science Foundation

Credit: Karen Pearce using a cellphone camera and telescope adapter

Saturn

Planet Saturn has beautiful rings and is the sixth planet from the Sun. NSF-funded scientists are studying Saturn's intense lightning storms, which are 10,000 times stronger than those on earth. *Did you know Saturn is the least dense planet in our solar system? If you were able to place it in a giant tub of water, the planet would float.*



National Science Foundation

Credit: Gemini Observatory/AURA/Henry Roe, Lowell Observatory/Emily Scheller, Institute for Astronomy, University of Hawaii

Double Cluster in Perseus

These two star clusters in our Milky Way galaxy were formed nearly simultaneously 13 million years ago. Each cluster has a few thousand stars but together are known as the Double Cluster. NSF-funded astronomers study clusters like these to unravel mysteries about our galaxy. *Did you know open star clusters are home to many massive young stars? Those bright orange stars are red giants in the final stages of life.*



National Science Foundation

Credit: M.A. Sharp/NOAO/AURA/NSF

TOP 10 AUTUMN TREATS:

- Saturn, Neptune, Moon
- Five stellar groups
- Two galaxies

You are here

Double Cluster

Albireo

Ring

Triangulum

Galaxy: far away...

M13

Does the Milky Way look like the Andromeda Galaxy? If so, here's where you would find the top 10 treats!



National Science Foundation

Credits: (front) background: T.A. Rector/NOAO/AURA/NSF; silhouette: Pete Harendel (NOAO); moon: Adam Block/NOAO/AURA/NSF (back); T.A. Rector and B.A. Wepa/NOAO/AURA/NSF

M33 Triangulum Galaxy



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M31 Andromeda



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2015

M27 Dumbbell Nebula



The WHITE HOUSE
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2015

M13 Hercules Globular Cluster



The WHITE HOUSE
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Albireo (Beta Cygni)



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M27 Dumbbell Nebula

The Dumbbell Nebula is a glowing shell of gas expelled from a dying star called a planetary nebula and was first discovered in 1764. NSF-funded researchers study planetary nebula to learn more about what happens when a star reaches the end of its life. *Did you know the central star left behind in a planetary nebula is a white dwarf, and Dumbbell Nebula's white dwarf is the largest one discovered to date?*

National Science Foundation



Credit: REU program/NOAO/AURA/NSF

M31 Andromeda

Andromeda Galaxy is our galactic neighbor – a large, spiral galaxy similar to our own Milky Way, but containing twice as many stars. Smaller satellite galaxies actually orbit Andromeda. NSF-funded astronomers study these satellite galaxies to test theories about some of the earliest star formation. *Did you know in 4 billion years the Andromeda galaxy will collide with the Milky Way?*

National Science Foundation



Credit: T.A.Rector and B.Wolpa/NOAO/AURA/NSF

M33 Triangulum Galaxy

The Triangulum Galaxy is a large, spiral galaxy with arms that contain enormous stellar nurseries where massive new stars develop. Observing beyond our galaxy is like looking back in time, and NSF-funded scientists study star-forming regions to learn more about the earliest stages of star and planet formation. *Did you know some of Triangulum's young stars are 120 times the Sun's mass and very hot: ~40,000 degrees Celsius?*

National Science Foundation



Credit: T.A.Rector (WFAO/AUI/NSF and NOAO/AURA/NSF) and M.Hanna (NOAO/AURA/NSF)

Albireo (Beta Cygni)

Distinctive Albireo is a close pair of stars that form a "binary" system. Albireo A (a brighter yellow star) and Albireo B (a fainter blue star) are dance partners locked together by gravity. NSF-funded scientists study binary stars, discovering new ways planets form. *Did you know that although the Sun stands alone, about 40% of stars like it form binary or multi-star systems?*

National Science Foundation



Credit: Allison McGraw/NOAO/AURA/NSF

M13 Hercules Globular Cluster

The Hercules Globular Cluster is a spherical stellar swarm packed with hundreds of thousands of stars. Globular clusters are among the oldest objects in the universe, so NSF-funded researchers can trace conditions in the universe at the earliest times when galaxies were just starting to form. *Did you know light from this cluster takes about 25,000 years to travel to Earth?*

National Science Foundation



Credit: T.A.Rector (University of Alaska Anchorage) and H.Schwelke (WVU and NOAO/AURA/NSF)

White House Astronomy Night 2015 Challenge: *Mars or Bust*



In collaboration with **NASA**

FACILITATOR COPY

Mars or Bust

Challenge

Using the provided materials and your knowledge of Mars, create a prototype for a structure that will be necessary to support life on Mars.

For the purposes of this challenge, structures include: buildings, transportations systems, and facilities that will need to be specially designed to support human life on Mars.

Time

Teams will have up to 5 minutes to RESEARCH the Red Planet using the provided fact sheet and then 10 minutes to use your IMAGINATION to create your structure prototype.

The Scene

NASA is about to send the first human spaceflight to Mars, but the buildings, cars, and other structures here on Earth aren't well suited to the harsh conditions on Mars. Variations in temperature, gravitational pull, atmospheric composition, and terrain all create unique challenges for construction. Your challenge is to create a prototype of a new structure more suitable for the Red Planet.

Materials

- 1 Pack of mailing labels
- 2 Pieces of paper
- 10 Popsicle sticks
- 5 Pipe cleaners
- 5 Straws

Presentation

Each team will present their prototype to the facilitator, making sure to explain its form and function on Mars and how it is UNIQUELY suited to help humans sustain life on Mars. Be sure to include at least ONE FACT learned from the research portion of the challenge.

FOR FACILITATORS ONLY

1. *Present each team of 2-7 students with a TEAM COPY of the challenge, and then read it aloud as the team follows along.*
2. *Present each team with the aforementioned materials.*
3. *At the end of the 15 minutes, have each team present their solution to you, they can also present to the group if that is suitable to your event.*
4. *Encourage teams to post their solutions to social media platforms using the hashtags #WHAstronomyNight #MarsOrBust.*

TEAM COPY

Mars or Bust

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Be sure to share your solutions on social media using the hashtags #WHAstronomyNight #MarsOrBust, with a short summary of your structure and the facts you learned about Mars.

RESEARCH MATERIALS

Since our first close-up picture of Mars in 1965, spacecraft voyages to the Red Planet have revealed a world strangely familiar, yet different enough to challenge our perceptions of what makes a planet work. Every time we feel close to understanding Mars, new discoveries send us straight back to the drawing board to revise existing theories.

You'd think Mars would be easier to understand. Like Earth, Mars has polar ice caps and clouds in its atmosphere, seasonal weather patterns, volcanoes, canyons and other recognizable features. However, conditions on Mars vary wildly from what we know on our own planet.

Over the past three decades, spacecraft have shown us that Mars is rocky, cold, and sterile beneath its hazy, pink sky. We've discovered

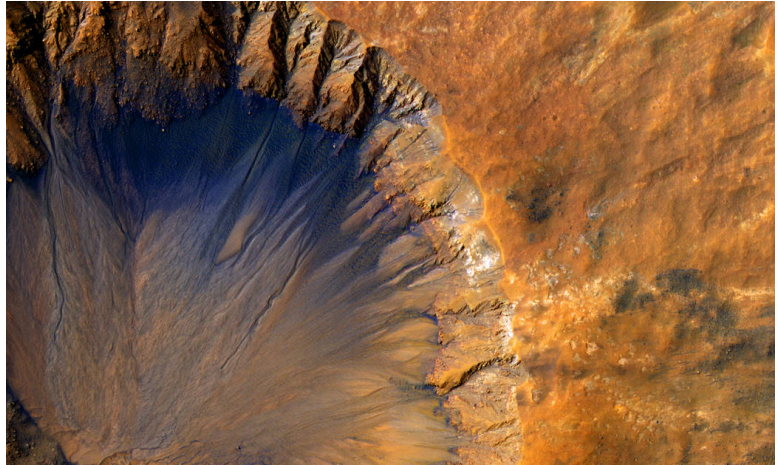
that today's Martian wasteland hints at a formerly volatile world where volcanoes once raged, meteors plowed deep craters, and flash floods rushed over the land. Mars continues to throw out new enticements with each landing or orbital pass made by our spacecraft.

Mars is a rich destination for scientific discovery and robotic and human exploration as we expand our presence into the solar system. Its formation and evolution are comparable to Earth, helping us learn more about our own planet's history and future. Mars had conditions suitable for life in its past. Future exploration could uncover evidence of life, answering one of the fundamental mysteries of the cosmos: Does life exist beyond Earth?

While robotic explorers have studied Mars for more than 40 years, NASA's path for the human exploration of



This low-angle self-portrait of NASA's Curiosity Mars rover shows the vehicle at the site from which it reached down to drill into a rock target called "Buckskin" on lower Mount Sharp.



Close-up image of a "fresh" (on a geological scale, though quite old on a human scale) impact crater in the Sirenum Fossae region of Mars on March 30, 2015. This impact crater appears relatively recent as it has a sharp rim and well-preserved ejecta.

Mars begins in low-Earth orbit aboard the International Space Station. Astronauts on the orbiting laboratory are helping us prove many of the technologies and communications systems needed for human missions to deep space, including Mars. The space station also advances our understanding of how the body changes in space and how to protect astronaut health. Our next step is deep space, where NASA will send a robotic mission to capture and redirect an asteroid to orbit the moon.

Astronauts aboard the Orion spacecraft will explore the asteroid in the 2020s, returning to Earth with samples. This experience in human spaceflight beyond low-Earth orbit will help NASA test new systems and capabilities, such as Solar Electric Propulsion, which we'll need to send cargo as part of human missions to Mars. NASA's powerful Space Launch System rocket will enable these "proving ground" missions to test new capabilities. Human missions to Mars will rely on Orion and an evolved version of SLS that will be the most powerful launch vehicle ever flown.

A fleet of robotic spacecraft and rovers already are on and around Mars, dramatically increasing our knowledge about the Red Planet and paving the way for future human explorers. The Mars Science Laboratory Curiosity rover measured radiation on the way to Mars and is sending back radiation data from the surface. Future missions like the Mars 2020 rover, seeking signs of past life, also will demonstrate new technologies that could help astronauts survive on Mars.

Engineers and scientists around the country are working hard to develop the technologies astronauts will use to one day live and work on Mars, and safely return home from the next giant leap for humanity. NASA also is a leader in a Global Exploration Roadmap, working with international partners and the U.S. commercial space industry on a coordinated expansion of human presence into the solar system, with human missions to the surface of Mars as the driving goal. Follow our progress at www.nasa.gov/exploration and www.nasa.gov/mars.

