NISE
NATIONAL INFORMAL STEM EDUCATION NETWORK

NISE Network Partner Meeting

Tempe, Arizona

February 2019

EXPLORE SCIENCE Earth & Space

www.nisenet.org

MOON PHASES

FULL MOON

GIBBOUS

FIRST QUARTER

CRESCENT

NEW MOON

CRESCENT

THIRD QUARTER

GIBBOUS

Incorporating Earth & Space Science into your Summer Camp

Presenters

Christine Shulpa, Lunar and Planetary Institute

Joan Haper-Neely, National Institute of Aerospace

Sarajane Gomlak-Green, Buffalo Museum of Science

Rhea Walkman, South Dakota Discovery Center

Kat Burkhart, Carnegie Museum of Montgomery County

NISE
NATIONAL INFORMAL STEM EDUCATION NETWORK

Explore Science: Earth & Space

2019 toolkits shipping at the end of this month!

Archived and digital kits: www.nisenet.org/earthspacekit

Other NISE Network projects & opportunities

Using Your Kit All Year Long

We encourage you to use your toolkit all year long, during celestial events, STEM events, and other programming for public audiences (such as scout programs, camps, afterschool clubs, science festivals, etc.). Events like those described above may be a better way to engage large and diverse groups of museum visitors. Camps, afterschool programming, field trips, and similar program formats are a great way to engage learners more deeply. Here are just some examples of how you might use and adapt toolkit materials to these different kinds of formats.

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We love to hear stories about how you've used NISE Network activities! To share your success with us, please contact your regional hub leader: *http://www.nisenet.org/contact*

Camps and Afterschool Programs

The sequential, longer format (45-90 minutes each) typical of a camp or afterschool program can encourage participants to immerse themselves in the activity and contextual information and ideas. This allows them the opportunity to develop a richer understanding of the concepts and connections provided by the activity materials and facilitation. Camps and workshops can begin with an overview of Earth and Space content and then, depending on time, you can plan to theme each week or cover the content more broadly. More intensive programming does have more constraints, however, and will require more resources for planning, promotion, preparation, and delivery. They work best in a separate space, require a specific start and end time, and often can accommodate fewer participants.

The following are some example daily themes and suggested activities you could use during a summer camp program or elementary afterschool program.

Mad About Mars

This collection of activities encourages participants to consider many interesting features of our nearest planetary neighbor, including dry ice polar caps and the planet's potential for life. Activities like Exploring the Solar System: Craters and Sublimation Bubbles (from NISE Network's *Let's Do Chemistry* kit) allow participants to interact with the physical properties of Mars, while Exploring the Solar System: Mars Rovers, Exploring Earth: Rising Sea, and Exploring the Universe: Imagining Life engage participants in the processes and tools that scientists use to learn about planetary bodies. Exploring the Solar System: Pocket Solar System can serve as an introductory activity, to give participants context for Mars' location in our solar system. In a summer camp setting, this topic pairs well with dramatic play activities related to human space exploration.

Exploring the Solar System: Mars Rovers
Players acting as "Mission Control" and a "Rover" must work together to navigate a large obstacle course. **> 20 minutes, Active, Indoor/Outdoor**
Scale it up: Engage campers who are waiting for a turn in re-arranging the felt squares to create a new course for the rover.
http://www.nisenet.org/catalog/exploring-solar-system-mars-rovers

Exploring the Solar System: Craters
Simulate the formation of meteorite craters, and then study the craters using special tools. **> 20 minutes, Exciting, Outdoor.** Scale it up: Replace the materials with a large flat under-bed style
utdoors, and be ready to get messy! Use a sturdy
urface" from different heights.
loring-solar-system-craters-2018

em
nces between objects in our solar system. **> 20**
tive: Have participants draw the named objects on
.
loring-solar-system-pocket-solar-system

then invent a living thing that could thrive in it. **< 20**
recycled materials to engage participants in
tured on the extremophile cards.
loring-universe-imagining-life

ck changes in sea level. **< 20 minutes, Calming,**
create landforms using oil-based modeling clay,
eople, animals, farms, etc. Engage in discussions
the changing climate.
loring-earth-rising-sea

gaseous carbon dioxide, and then capture the gas
oor.
on-bubbles

design tools, experiment with variables, and
Universe: Pack a Space Telescope, Rocket
ckets allow for building, crafting, and iterative
g from aerodynamics to effective teamwork.
g Earth: Static Electricity can serve as a break
ticipants the opportunity to consider challenges
d deploying spacecraft. In a summer camp setting,
n activities, such as building Rube Goldberg

e
telescopes. **> 20 minutes. Exciting. Indoor**
of craft supplies and invite them to work in pairs or
ge conversation about the many designs that NASA
l form.
loring-universe-pack-space-telescope-2018

Exploring the Universe: Orbiting Objects
Experiment with different sized and weighted balls on a stretchy fabric gravity well. **< 20**
If using as a drop-in activity, challenge participants who
explain the phenomena to newcomers.
g/exploring-universe-orbiting-objects

kets
to help imagine the challenges and triumphs of
hem into a specific region of the space above our planet.
. Get creative: Spend time decorating rockets, and
fins and nose cones.
g/exploring-solar-system-stomp-rockets

y
static electricity. **> 20 minutes, Precise, Indoor.**
construct many versions of the basic electroscope
e a variety of ways to produce static electricity.

ing soda & vinegar "rockets." **< 20 minutes, Exciting,**

ket-reactions

ne and only moon. In a summer camp setting, this topic is
of the Apollo missions! Round out the day by
Moon landing, or by constructing an imaginary lunar
deas to celebrate the 50th anniversary of the Apollo 11
isenet.org/moon50.

all Moon
oncept of apparent size and allows visitors to experience
—a tennis ball and a beach ball. < 20 minutes, Active,

arious sizes of smaller balls, and invite them to spread out
way do you think you will have to be before your ball looks
our friend have to be the same distance away?"
g/exploring-solar-system-big-sun-small-moon

eek Moon
er, and the *Moon Rope* storybook let participants
tant objects appear closer and brighter and learn about
ewed the Moon. **> 20 minutes. Calming. Indoor**
y reading *Moon Rope* aloud together and discussing

g/exploring-solar-system-hide-and-seek-moon

e
f the Sun, Earth, and Moon to create shadows and learn
ming, Outdoor.
lendar to predict when the next solar eclipse will be

g/exploring-solar-system-solar-eclipse

We couldn't do this work without all of you!

Christine Shupla

NASA Science Activation

"Education is not the filling of a pail, but the lighting of a fire…and NASA is the spark"

https://science.nasa.gov/learners

NASA Science Mission Directorate

Key Science THEMES

SAFEGUARDING & IMPROVING LIFE ON EARTH

SEARCHING FOR LIFE IN THE SOLAR SYSTEM & BEYOND

DISCOVERING THE SECRETS OF THE UNIVERSE

Partnerships to Reach Camps

The Lunar and Planetary Institute collaborates with the American Camp Association and the NASA Science Activation community to bring information, resources, and opportunities to the American camp community.

Dr. Hakeem Oluseyi, NASA SMD HQ *conducted the keynote presentation at the ACA national conference in 2018*

National ACA conference attendees explored NASA activities and resources at booths and in sessions in 2013 - 2018.

2019 ACA Session:
NASA: The Once and Future Moon

On July 20, 1969, the Apollo 11 astronauts first walked on the Moon. Our explorations have taught us much in the past 50 years, as we continue our explorations from the Moon to Mars.

Celebrate this summer's anniversary and ongoing exploration with fun hands-on activities.

Scale Models Compare models of the Sun-Earth and the Earth-Moon system.
Model of Sun and Earth: https://bit.ly/2S6MFJd
Model of the Earth and Moon: https://bit.ly/2Sbl8Gw

Moon Ooze Model how the dark lunar "seas" formed with edible materials.
https://bit.ly/2FT51lj

Engineering Build, test, and redesign a lunar landing capsule
https://go.nasa.gov/1UGGMZp

More activities will be at science.nasa.gov/learners/wavelength

Explore!

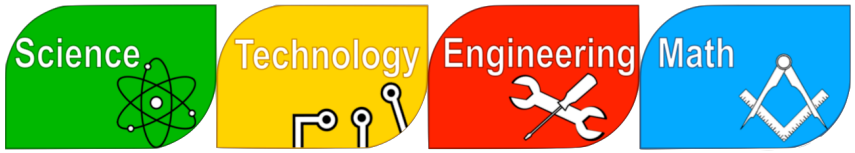
Space Science activities
for out-of-school programs

www.lpi.usra.edu/education/explore

For more information about NASA's work with the American Camp Association or the Lunar and Planetary Institute's programs, see Christine Shupla (shupla@lpi.usra.edu).

Joan Harper-Neely

NASA eClips™



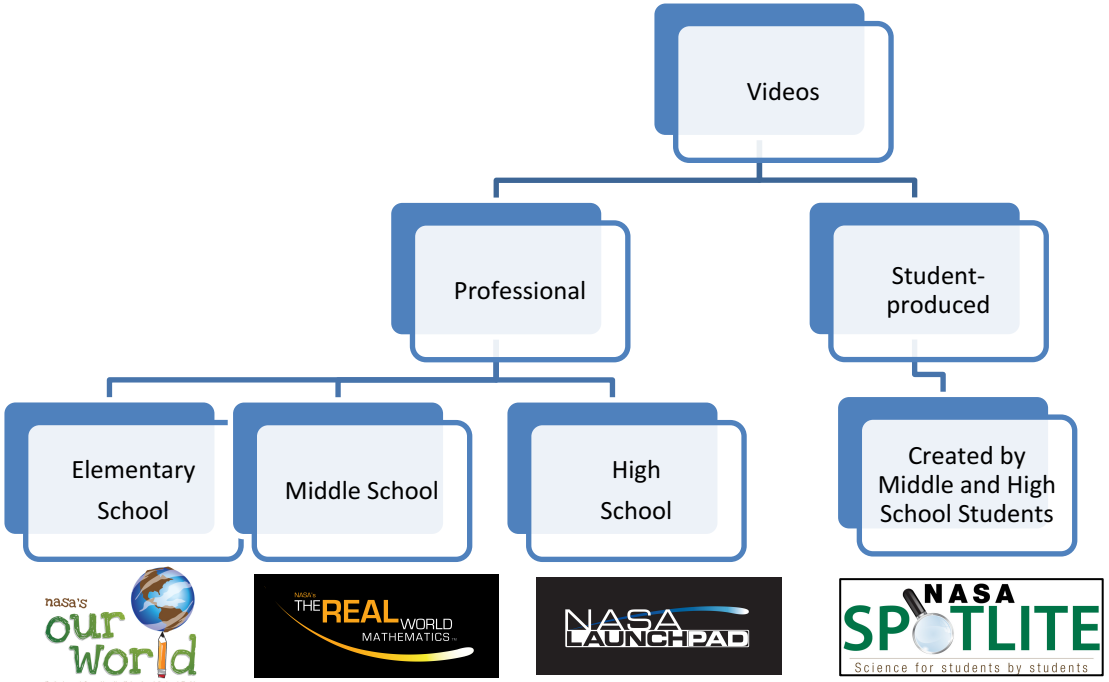
NASA ECLIPS™ 4D RESOURCES

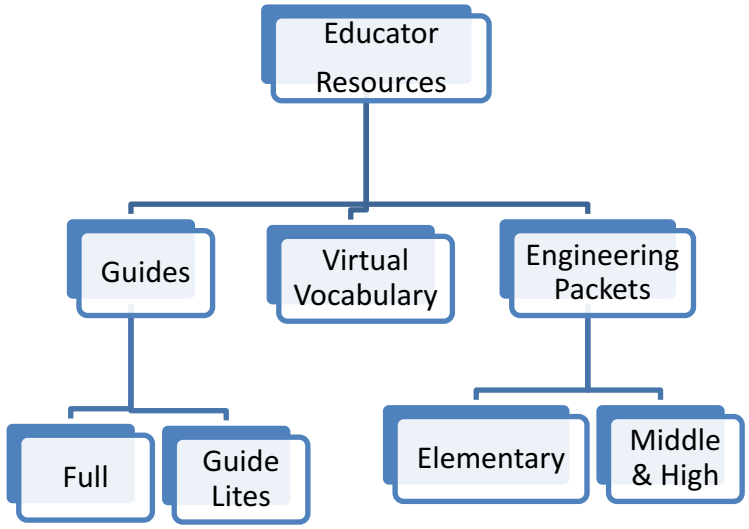
HTTPS://NASAECLIPS.ARC.NASA.GOV/

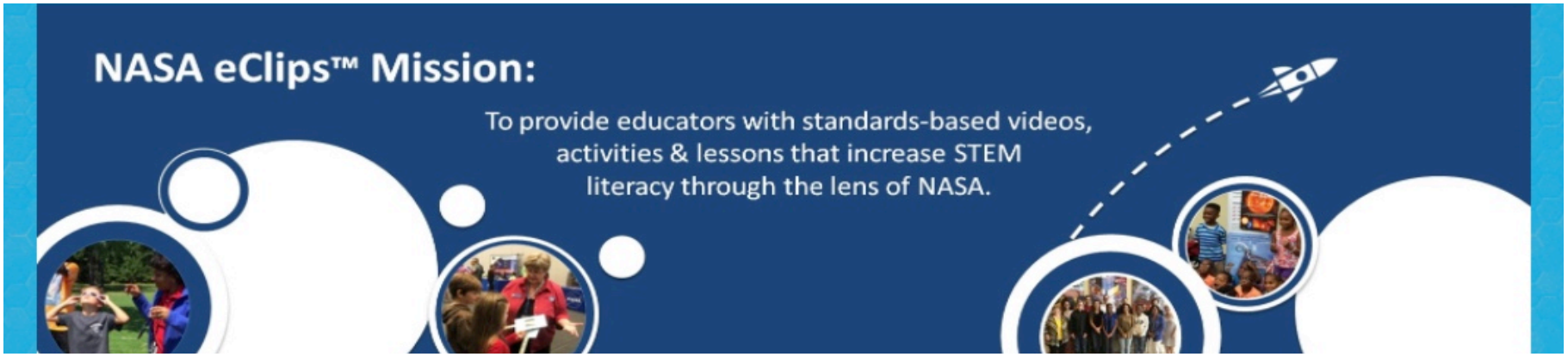
NASA eClips™

- **Joan Harper-Neely**
  - STEM Education Specialist
  - National Institute of Aerospace
  - JOAN.HARPER-NEELY@NIANET.ORG

https://nasaeclips.arc.nasa.gov/

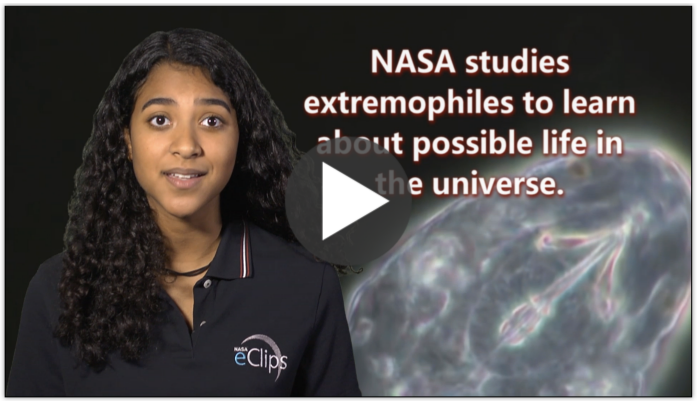






https://nasaeclips.arc.nasa.gov/

NASA eClips Videos



Description

Almost every possible environment on Earth is home to a living organism, no matter how hostile the environment may seem. But what can these extremophiles tell us about life on our planet or the possibility of life in the universe?

Published on: June 05, 2018

Download Video
Caption File
YouTube
NOTE: Download Caption file and link it in your player to get caption in the video.

Keywords

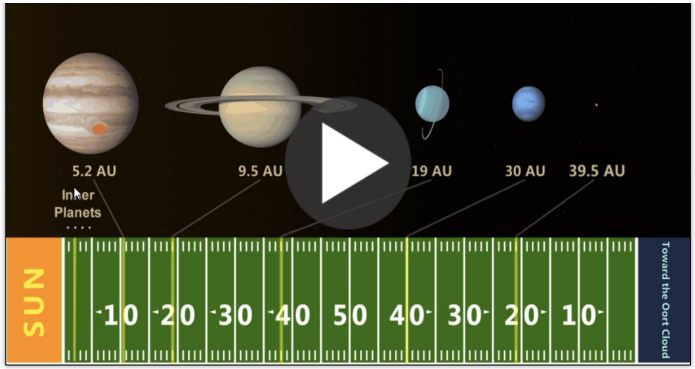
Related Links

Related NASA eClips Resources

- NASA eClips Our World: Life on Other Worlds. K-5
- NASA eClips Launchpad: Astrobiology. 6-8, 9-12

Background Information

- NASA Extreme Life Forms Might Be Able to Survive on Eccentric Exoplanets. 6-8, 9-12
- NASA Extremophile Hunt Begins. 6-8, 9-12
- NASA NASA Finds Life at 'Extremes'. K-5, 6-8, 9-12
- NASA Now Extremophiles. K-5, 6-8, 9-12
- WGBH The Most Extreme Life Forms On Earth... And Beyond?. K-5,



Description

Paul Chodas, Manager for NASA's Near Earth Object Program, explains Astronomical Units (AUs) and how this unit of measure helps simplify an understanding of distances within the solar system. To further simplify thinking about these vast distances, distances within the solar system are explained scaled to the size of a football field.

Published on: August 15, 2018

Download Video
Caption File
YouTube
NOTE: Download Caption file and link it in your player to get caption in the video.

Keywords

Related Links

Related NASA eClips Resources

- NASA eClips Our World: What is a Solar System?. K-5

Background Information

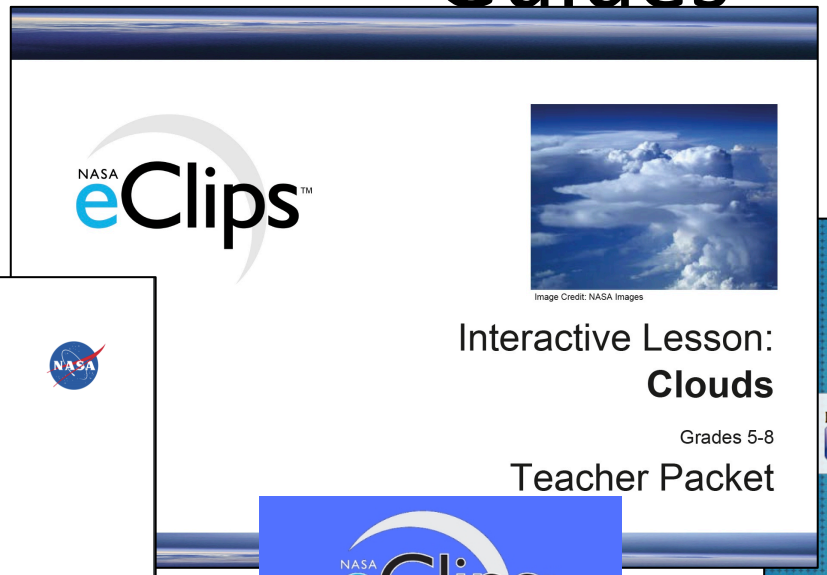
- Amazing Space Solar System Trading Cards. 6-8
- NASA Solar System Exploration. 6-8
- NASA Voyager. 6-8
- NASA JPL Cassini Legacy: 1997-2017. 6-8
- NASA SpacePlace Where Does the Solar System End?. 6-8

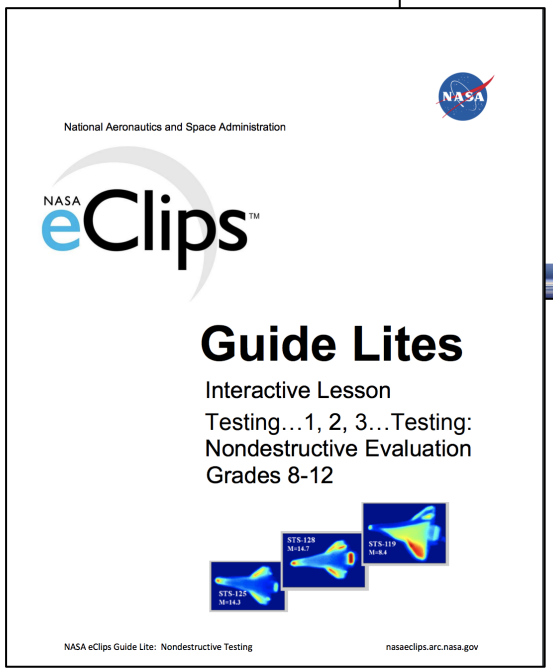
Activities

- Lunar and Planetary Institute Solar System in My Neighborhood. 6-8
- NASA Scale Models of the Solar System. 6-8

https://nasaeclips.arc.nasa.gov/

NASA eClips Educator Guides





Science Technology Engineering Math

https://nasaeclips.arc.nasa.gov/

NASA Spotlite Lessons

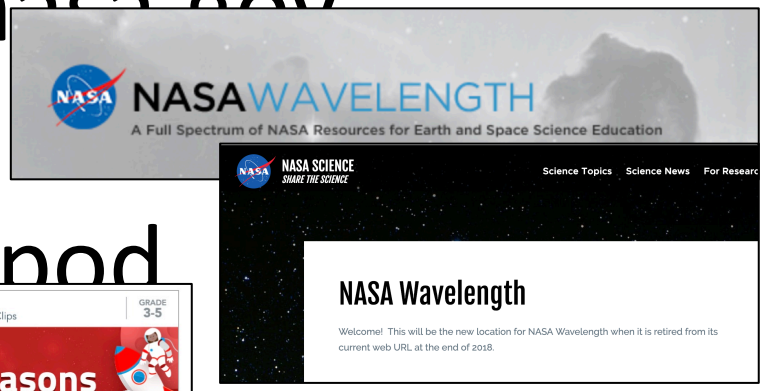
Student-produced Videos Addressing Common Science Misconceptions Paired With Interactive Lessons Using The 5E Model

https://drive.google.com/file/d/1lh1CShPq-I9AxQAU7TGSNfp1cBkrrI-_/view

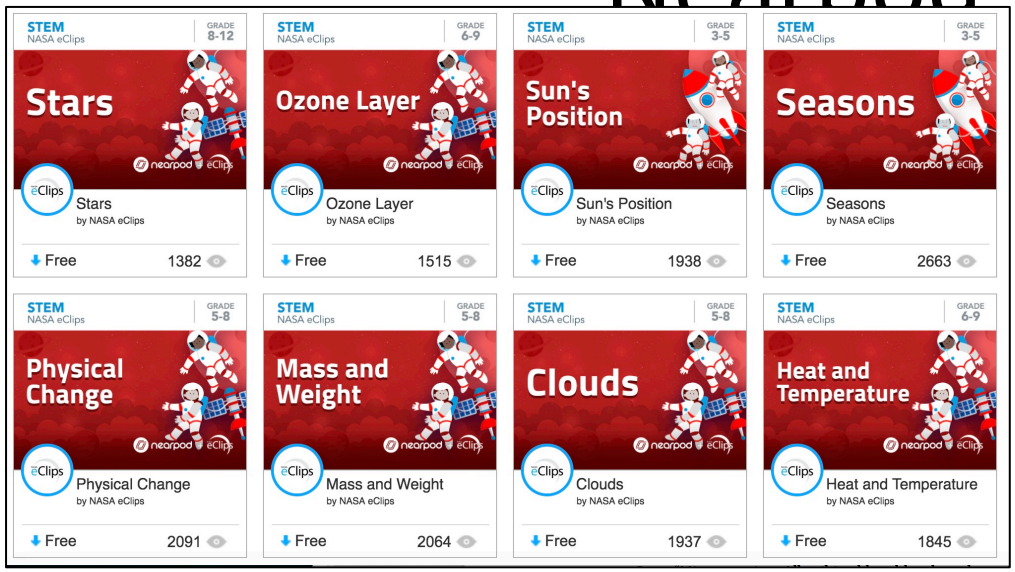
https://nasaeclips.arc.nasa.gov/

NASA spotlite Lessons on

science.nasa.gov



Nearpod



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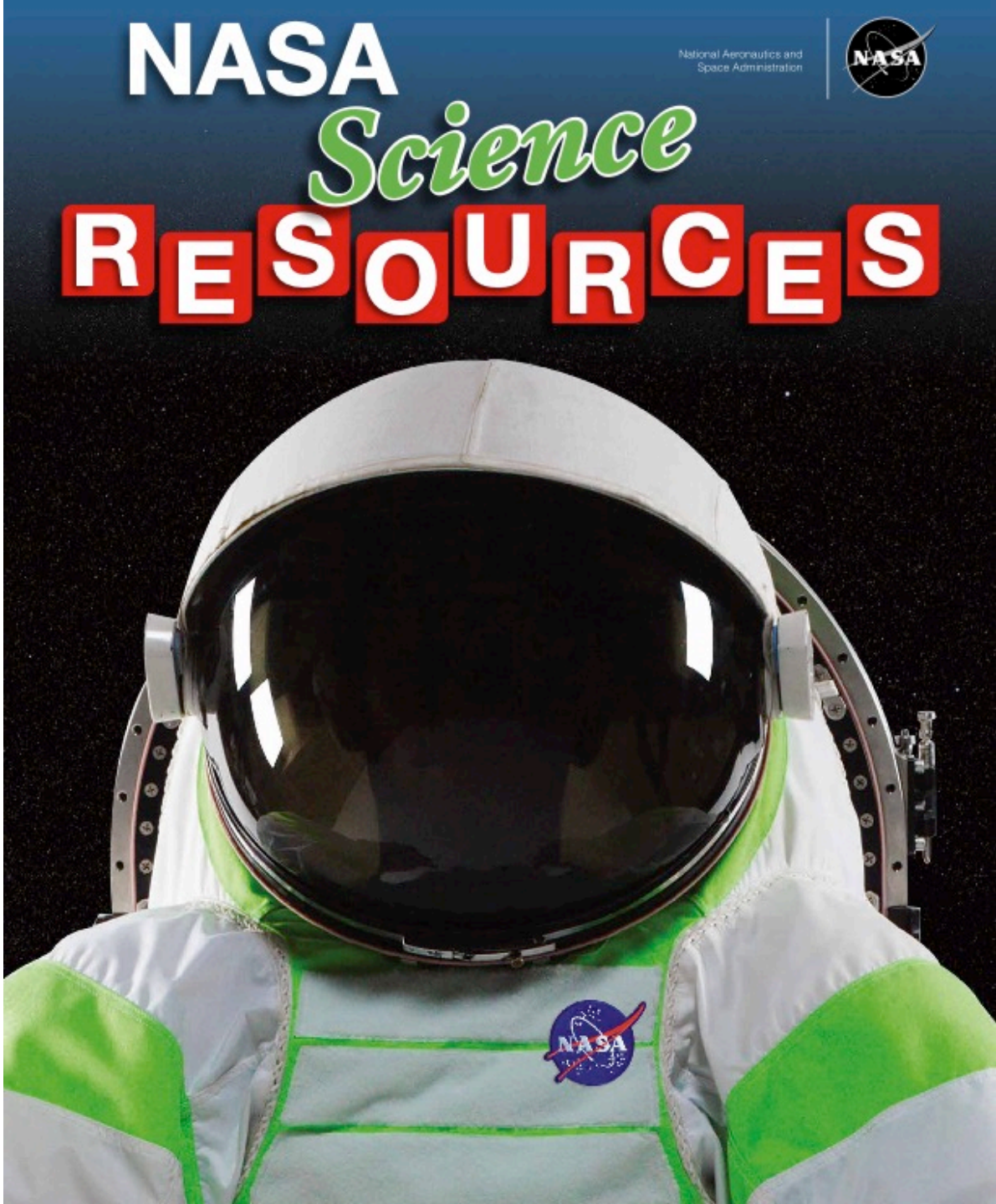
Learn More at

https://nasaeclips.arc.nasa.gov/

NASA SCIENCE RESOURCES FOR LEARNERS

https://eospso.nasa.gov/sites/default/files/publications/NASA%20Science%20Resources.pdf



Sarajane Gomlak-Green

Sarajane Gomlak-Green

Science Communicator and School Services Manager

A bit about the BMS…

Museum under construction, 1926

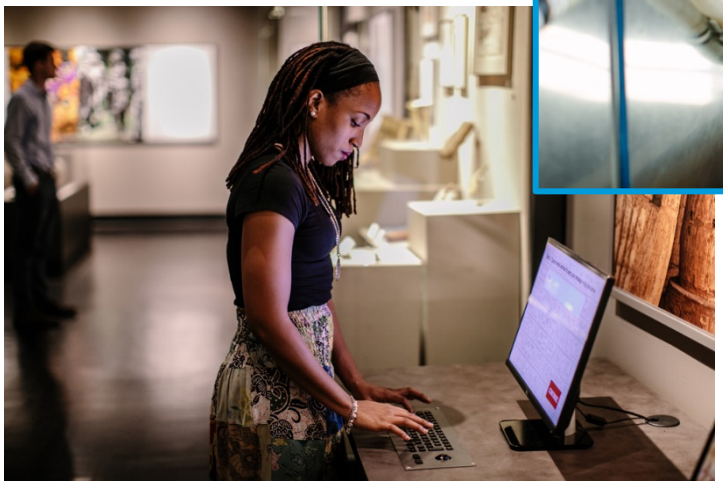
- **Buffalo Society of Natural Sciences – established in 1861**
- **Museum built in 1929 to house the society's collections**

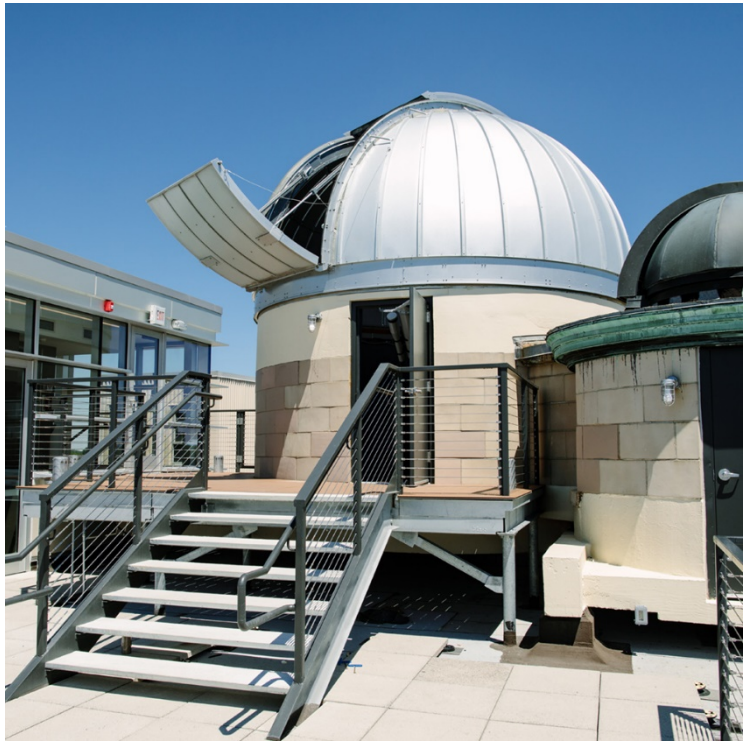
BUFFALO MUSEUM OF SCIENCE

A bit about the BMS...

BUFFALO MUSEUM OF SCIENCE

BUFFALO MUSEUM OF SCIENCE





Kellogg Observatory

E.E. Both Memorial Telescope

Discovery Camps

Camps take place throughout the school year and during summer recess at both the museum and Tifft Nature Preserve

Number of campers from October 2017-September 2018: 1,267

Age ranges include

- 3-4
- 5-6
- 7-9
- 10-12
- 13+

Discovery Camps

Sample Themes:
Astronaut Adventure (Ages 5-6, 7-9)

- Ice Orbs
- Imagining Life
- Pocket Solar System
- Stomp Rockets
- Mars Rovers (to various levels of success)
- Rocket Reactions (Let's Do Chemistry)
- Molecules in Motion (Let's Do Chemistry)
- Space Elevator (NanoDays)
- Mitten Challenge (NanoDays)
- UV Bracelets (NanoDays)

Discovery Camps

Sample Themes:
Solar System Science (Ages 10-12)

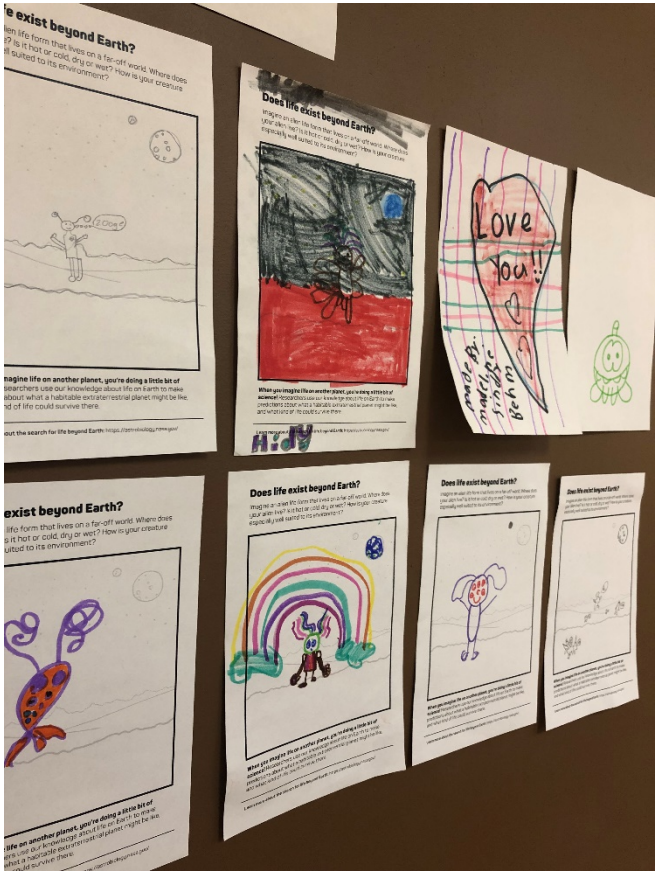
- Orbiting Objects
- Mars Rovers
- Pocket Solar System
- Craters
- Mars Rovers
- Magnetic Fields
- Filtered Light
- Objects in Motion
- Sublimation Bubbles (Let’s Do Chemistry)

BUFFALO MUSEUM OF SCIENCE

Discovery Camps

Final Thoughts

- During the summer, we have many temporary counselors and assistant counselors. NISENet kits and training videos have been invaluable for not only training content, but also facilitation approaches.
- We have found that some activities are more appropriate for camps, while others are more appropriate for pop-up science tables.
- Some activities work very well for “free time”, early drop off or aftercare.



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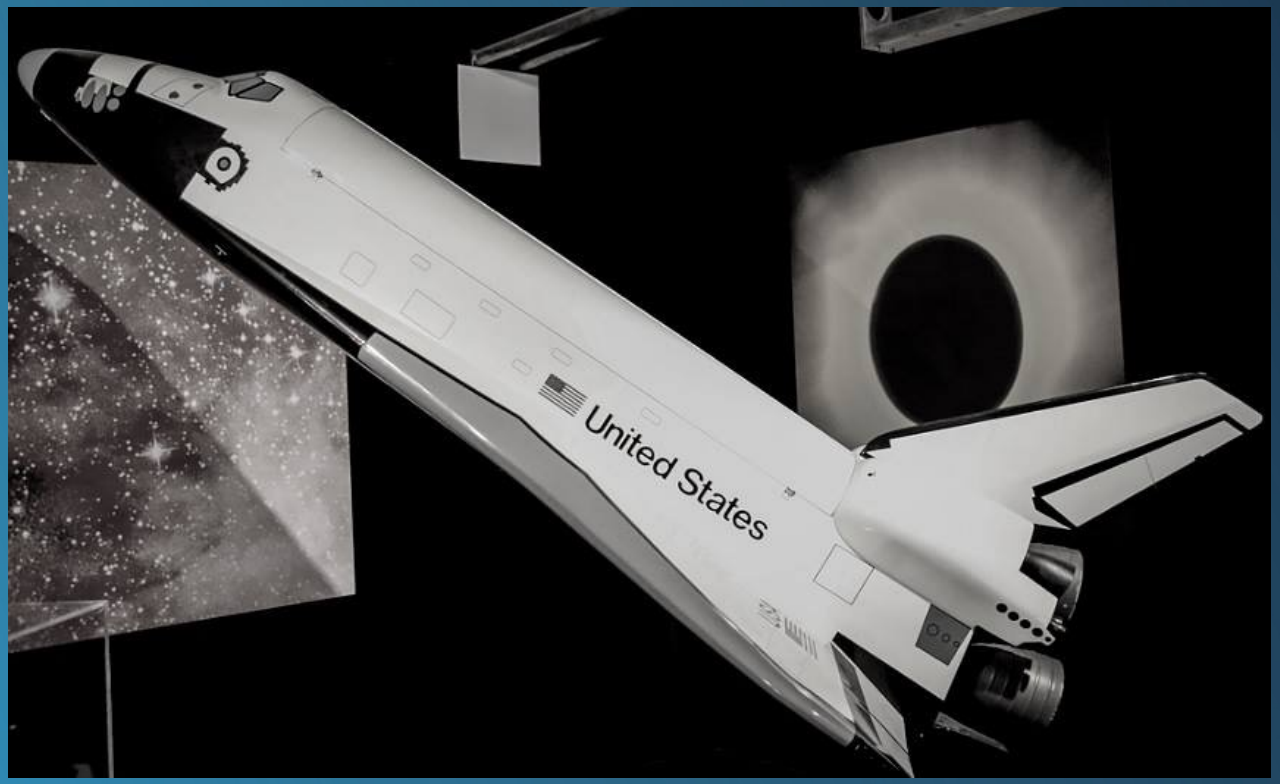


Rhea Waldman

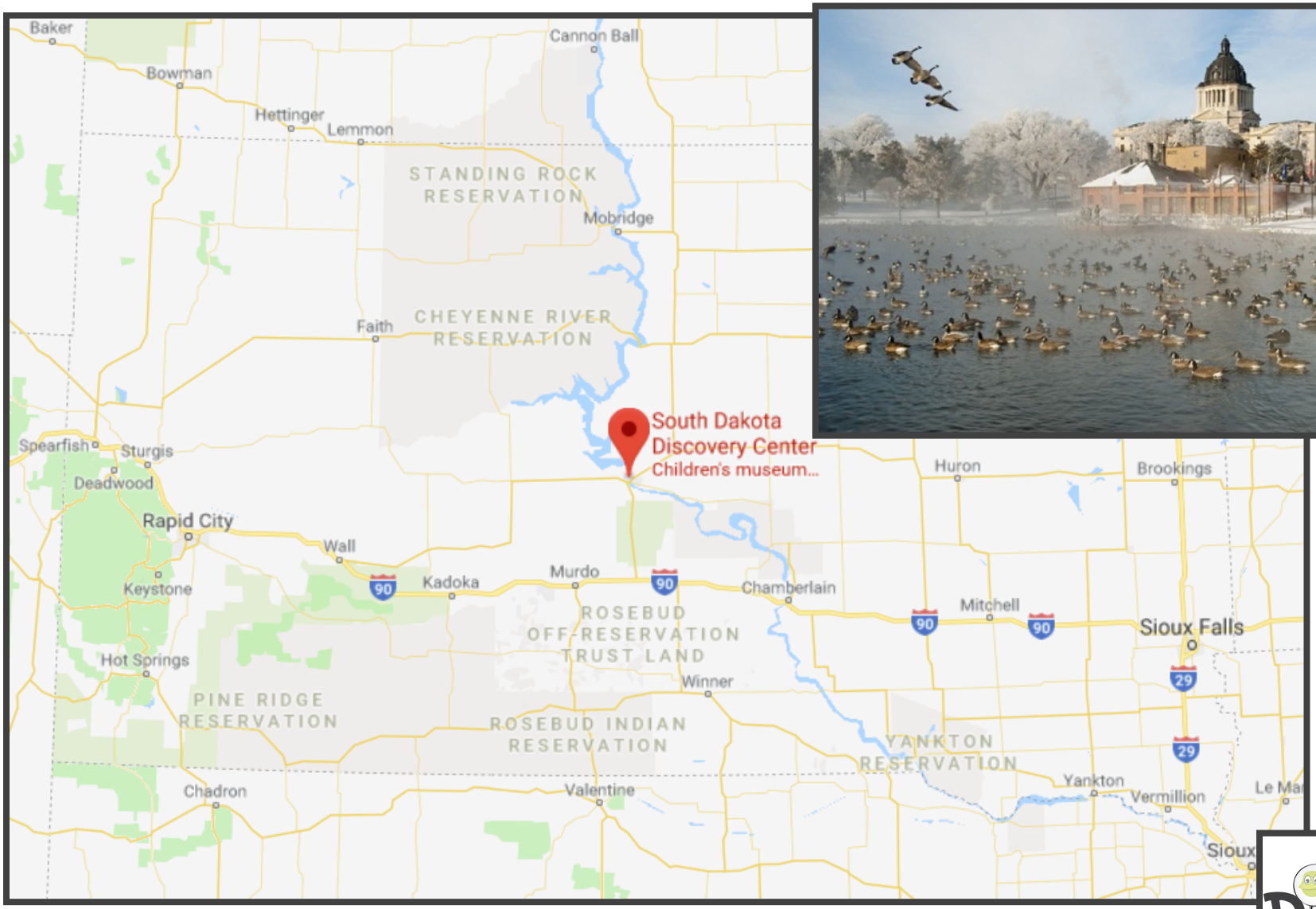
SD Discovery Center

805 W Sioux Ave, Pierre, SD 57501

www.sd-discovery.org

Dr. Rhea Waldman | Education Director

Pierre, South Dakota

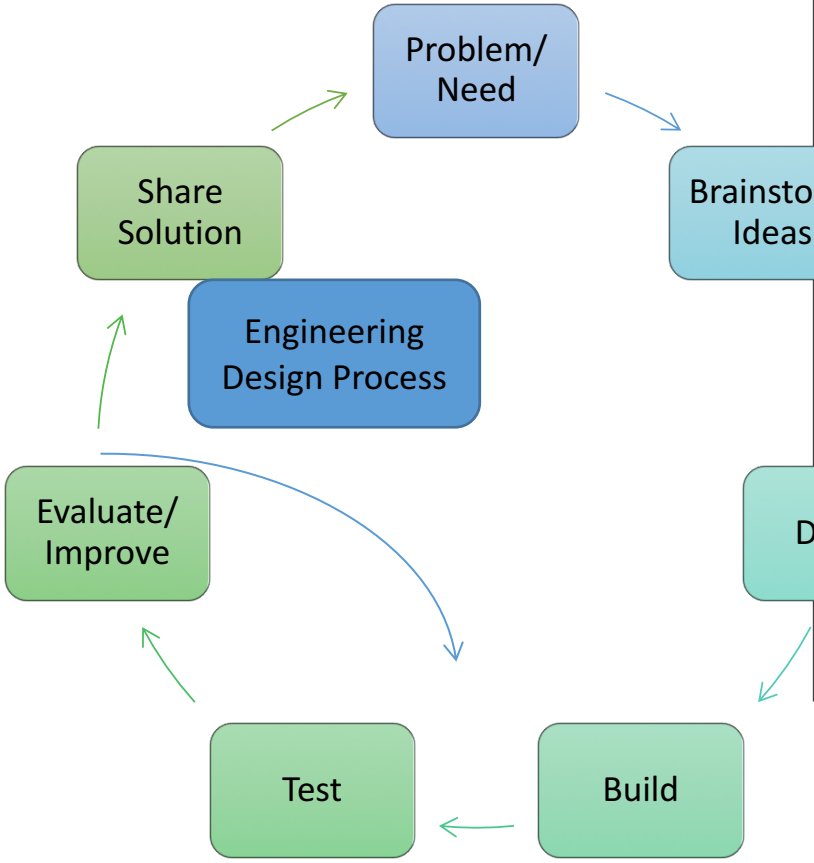


SD Discovery Center
805 W Sioux Ave, Pierre, SD 57501 | www.sd-discovery.org

NISE Toolkits at Space Camps

Design Process and Scientific Tools

- Stomp rockets
- Pack a space telescope
- Mars Rover
- Ice orbs
- Solar eclipse



NISE Toolkits and Girl Scout Space Science

Brownie (b) – Space Science Adventurer

Junior (j) – Space Science Investigator

- Pocket Solar System
  - meet the neighbors (b)
  - model the solar system (j)
- Orbiting Objects
  - model the solar system (j)
- Objects in Motion
  - circle the sun (j)
- Mars Rover
  - use tools to explore (j)

girl scouts dakota horizons

Harvard Smithsonian Center for Astrophysics

Students exploring the universe:

- Request and process images from space
- Learn about telescopes
- Explore different objects in space
- Look at light and colors in space
- Capstone project winners displayed at SD Discovery Center

YouthAstroNet
Harvard-Smithsonian Center for Astrophysics

Space curriculum additions

MS-ESS1 – Earths Place in the Universe

Earth-Moon-Sun system
Gravity within galaxies and solar system
Size and Scale in the solar system

- Pocket Solar System
- Orbiting Objects
- Objects in Motion
- Filtered Light

Extensions

- Ice Orbs
- Exoplanet Transits
- Imagining Life

Kat Burkhart

Carnegie Museum of Montgomery County, Crawfordsville, IN

The Carnegie Museum of Montgomery County is:

- An interdisciplinary museum of Science, History & Art
- A free public Museum (like a free public Library)
- Built in Indiana's oldest Carnegie Library

Museum Staff

1 full time
3 part time
1 intern
15 volunteers

Crawfordsville, IN

Population 16,174

(2017)

Montgomery County, IN

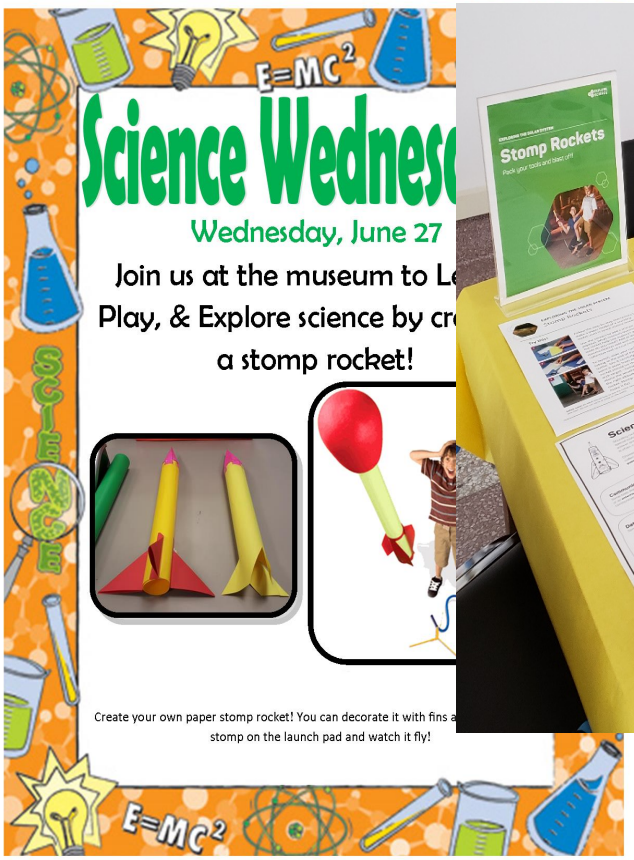
Population 38,525

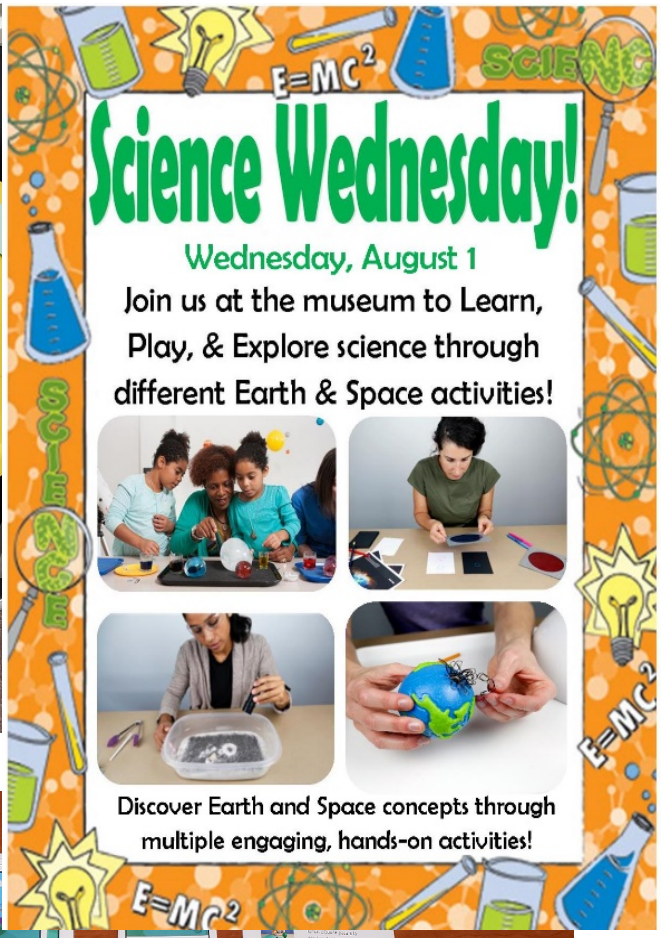
(2017)

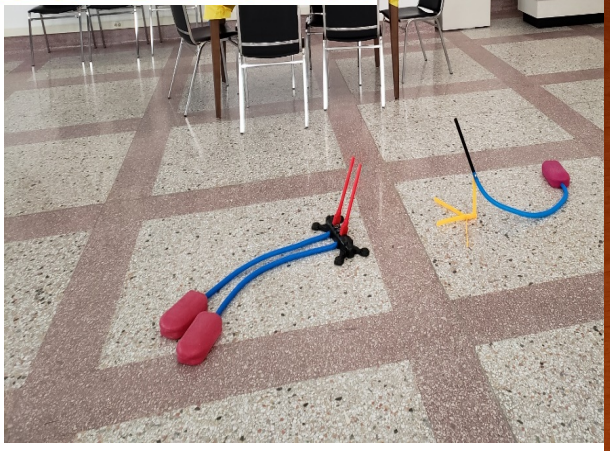
Summer at the Museum program - Kids earn prizes by completing activities in the museum. The program usually takes five "days" or five visits to complete, and the prizes get better the farther along they go. There are also bonus prizes!

Blue Day

1. Find & Explore the "Hide and Seek Moon" activity.
2. Use the "Hide and Seek Moon" worksheet at the activity table and mark where you found the animals on the moon.
3. Stand on the big "X" on the floor. Use the binoculars and look at the wall that says "Look Here." See if you can find the hidden emoji icon (smiley face) on the wall.
4. Did you find it? What was the emoji?
5. The novel, *Frankenstein*, will be how many years old this year?
6. Find the craft table and make your own bookmark.
7. Find the microscopes and look at one thing. Draw what you looked at in the space provided on your answer sheet.
8. Look at your fingerprint under the microscope. Draw what it looks like in the space provided on your answer sheet.
9. Find the origami table and make an origami creation of your choosing.
10. Find the voting booth and cast your vote!







We added and changed a few things, but not much!

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We tried all of the activities, these were the big hits.

NISE NET Kits

Earth and Space 2017

Bear's Shadow

Pocket Solar System

Big Sun, Small Moon

Orbiting Objects

Ice Orbs

Imagining Life

Earth and Space 2018

Mars Rovers

Craters

Hide and Seek Moon

Filtered Light

Stomp Rockets

Paper Mountains

And other kits…
NanoDays
Building with Biology
Frankenstein
Let's Do Chemistry

Because they are simple, self-contained and portable, we are able to use the kits in different ways in multiple galleries of the museum.

Above: see Hide and Seek Moon, Mars Rovers, Stomp Rockets and Squishy Circuits (from Frankenstein)

Thank you!

Questions?

Thank You!

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