



NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK

NISE Network Partner Meeting
Tempe, Arizona
February 2019



EXPLORE SCIENCE
Earth & Space

www.nisenet.org

Getting the Most Out of Your Explore Science: Earth & Space Toolkits



Presenters

Jacob Heck, Bootheel Youth Museum,
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Cailee Smith, ECHO, csmith@echovermont.org

Mike Rathbun, Discovery Museum,
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Hever Velazquez, Science Museum of
Minnesota, hvelazquez@smm.org

Explore Science: Earth & Space



2019 toolkits shipping at the end of this month!

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

Other NISE Network projects
& opportunities

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



Jacob Heck

STAFF DEVELOPMENT IN A SMALL MUSEUM

JACOB HECK OF THE BOOTHEEL YOUTH MUSEUM



MUSEUM

- Children's Science Center
 - Provides an engaging atmosphere for all people
 - Specialize in engaging children and youth
- Located in Malden Missouri
 - Rural Farming Community
 - Poorest part of Missouri
- Population about
 - 3,983
 - Over 27,000 visits a year
 - 5,425 Visits



STAFF/VOLUNTEERS

- Budget
 - 260k
 - No budget for Staff Training
 - Two full Time People
- Accessibility
 - Free online
 - Easy access for new Staff
- How we use NiseNet
 - We use NiseNet's Curriculum, Training Videos, and training documents
 - We use Nisenet's Formula to make our own training documents



TEAM BASED INQUIRY (TBI)

- NANO Exhibition

- Used what we learned about TBI in the development of the area that would house the Nano Exhibition when it arrived in Malden. We actually talked about what improvements we could make using NISEnets model and did a renovation around the exhibit.
- Renovation including:
- Nano Bite Snack Area
- Hands on Lab with storage for NISEnet
- Improved signage
- And two small exhibits
- Check NISEnet for more info



NISENET UNIVERSAL DESIGN GUIDELINES

- The guide helped in renovation of three exhibits:
- Medical Center
- Restaurant into a Pizzeria
- Grocery Store into The Market



Medical Center sponsored by Southeast Health



THIS

Becomes this!

OH AND DID I MENTION...

- They have FREE EXHIBITIONS! And they make super awesome stuff!

Cailee Smith



Cailee Smith

csmith@echovermont.org





eCHO[®]

LEAHY CENTER FOR LAKE CHAMPLAIN

ECHO's mission is to inspire and engage families in the joy of scientific discovery, wonder of nature, and the care of Lake Champlain.



- Annual Attendance: 167,000
- Predominantly families with children ages 0 – 8
- Natural history and live animal exhibits
- Rotating exhibit hall that highlights diverse subjects
- Hands-on STEM activities and science festivals

Engaging Underserved Audiences

ECHO Open Door Program

- Partners with over 50 social service agencies across state to provide:
 - Free admission for 33,000 people
 - 2,200 free family memberships
 - Over 4,000 \$2 admission vouchers
 - Discounted passes for 615 libraries across VT
- Low-income families, new American families, rural communities, at-risk youth, differently abled



E-Team

- Teen development program for high school freshman and sophomores
- Goals: Improve STEM literacy, learn career skills & awareness, gain leadership experience



Connecting Guests with Physical Science

- Use the familiar as a bridge to the unknown
- Focus on observable concepts
- Keep it hands-on!



Gathering and Engaging a Large Audience around a Major Event



Building Meaningful Partnerships

- ECHO has partnered with the University of Vermont since 2008
 - Physics Department
 - Society for Physics Students
 - Sigma Pi Sigma
- 1-2 special events in partnership with ECHO events each year
- Collaboration and feedback during development of hands-on activities



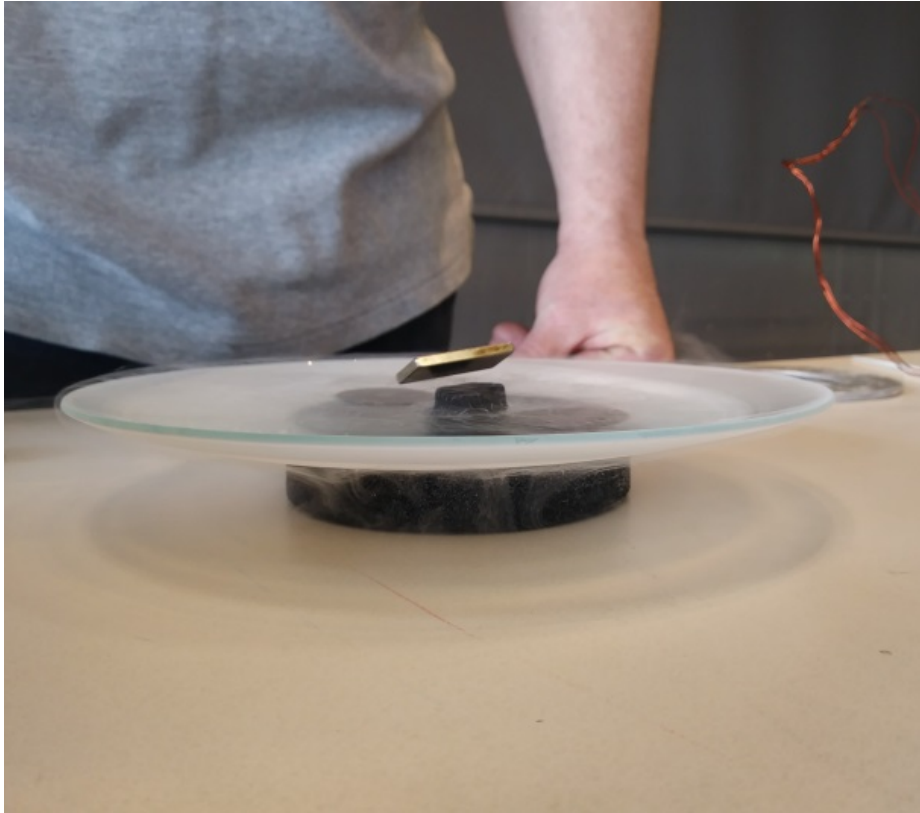
Building Meaningful Partnerships

Make sure your partnership is mutually beneficial and engages students

- Service requirements
- Grant-required outreach
- Improved content and diversity of activities
- Experts in field at your event
- Everyone feels appreciated and valued



Draw in Your Audience with “Wow!” Demonstrations

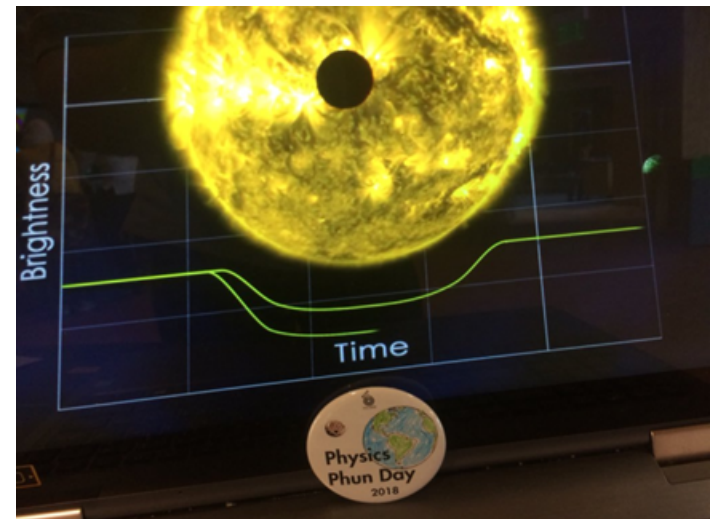


Electromagnetism Science Show

Elevating Toolkit Activities

Foster collaboration and creativity and capitalize on your partners' expertise and resources

- Are there additional hands-on components that would increase guest engagement?
- Are there tools used in experiments and research that guests can interact with?
- Is there a demonstration that relates the concept to a phenomenon guests experience?
- Is there a demonstration that creates a more memorable and impactful experience?



2017 Toolkit Activity – Orbiting Objects

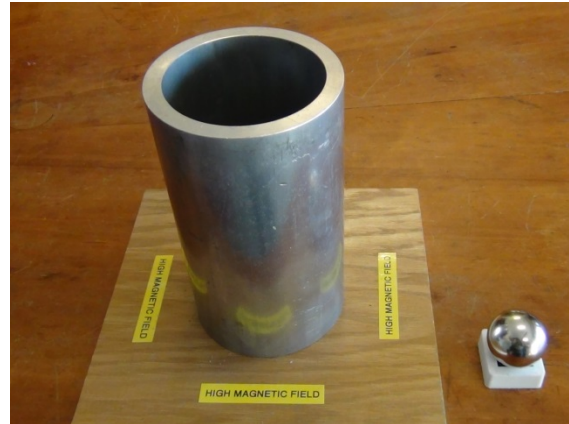


Guests could use a computer program to simulate the orbits of moons and planets and manipulate different variables: size of moon and planets, size of orbit, and path of orbit.

2018 Toolkit Activity – Explore Magnetic Fields



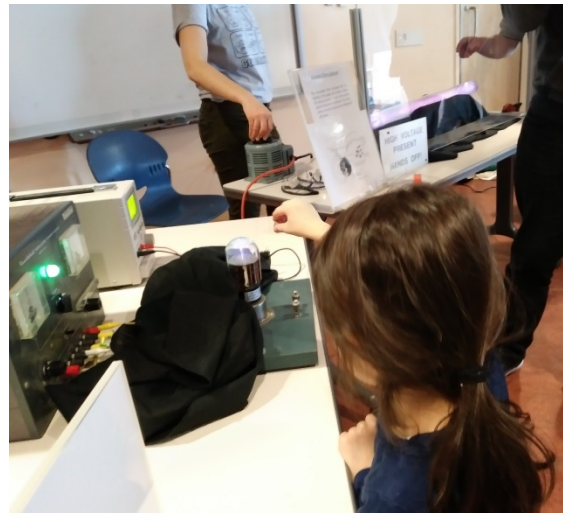
Observing dark sunspots



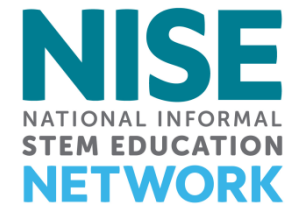
Experiencing magnetic fields and Lenz's Law



Observing the interaction between a moving charge and a magnetic field



Making connections to the aurora borealis



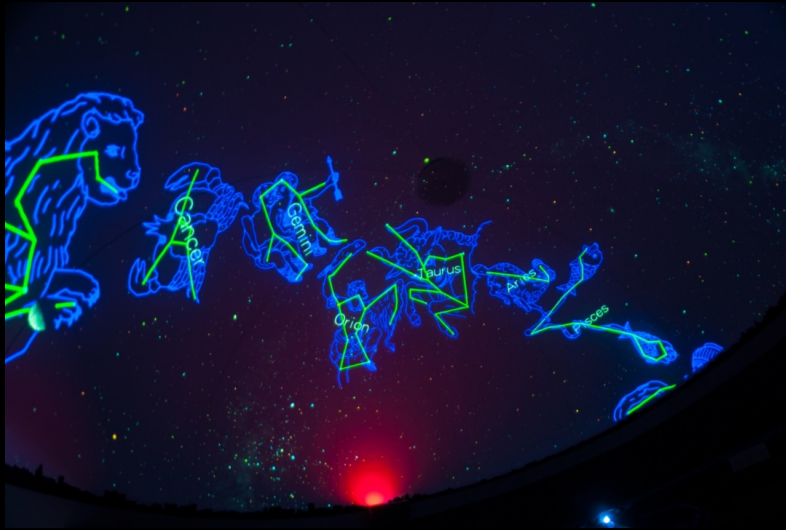
Mike Rathbun

Mike Rathbun



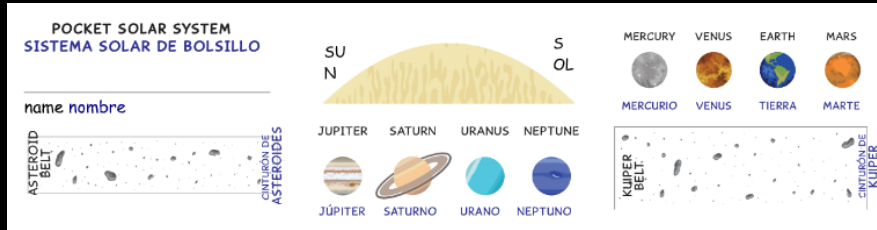
Discovery Center
Museum
Rockford, IL

Astronomy Field Trips



- Planetarium show
- Great Balls of Fire Exhibit
- Sun, Earth, Universe Exhibition
- STEM Lab (using Explore Science: Earth and Space)

Replicate/Modify



Exploring the Universe: Orbiting Objects (2017)



Description

"Exploring the Universe: Orbiting Objects" is a hands-on activity that invites visitors to experiment with different sized and weighted balls on a stretchy fabric gravity well. The activity models gravitational attraction in space. Participants investigate how changing conditions can cause phenomena like stellar wobble and planet formation.

Product category

Programs and Activities
Short Activities

Audience

Ages 4 - Adult

Topics

Earth and Space Science | Astronomy | Earth, Moon and Sun |
Solar System | Physical Sciences | Motion and Forces

- Family Nights
- Teacher Workshops
- After School programming
- Scouts
- Summer Reading Program

Hever Velazquez



Science
Museum
of Minnesota

120

Mississippi
Visitor



Public Impacts Summative Evaluation:

Explore Science: Earth & Space Activity Toolkits

Hever Velázquez



Contents:

Public Impact Toolkit Summative Evaluation Main Findings

Partner Site Data Collection

Activity Enjoyment and Interest

Interest and Curiosity in Earth & Space Topics

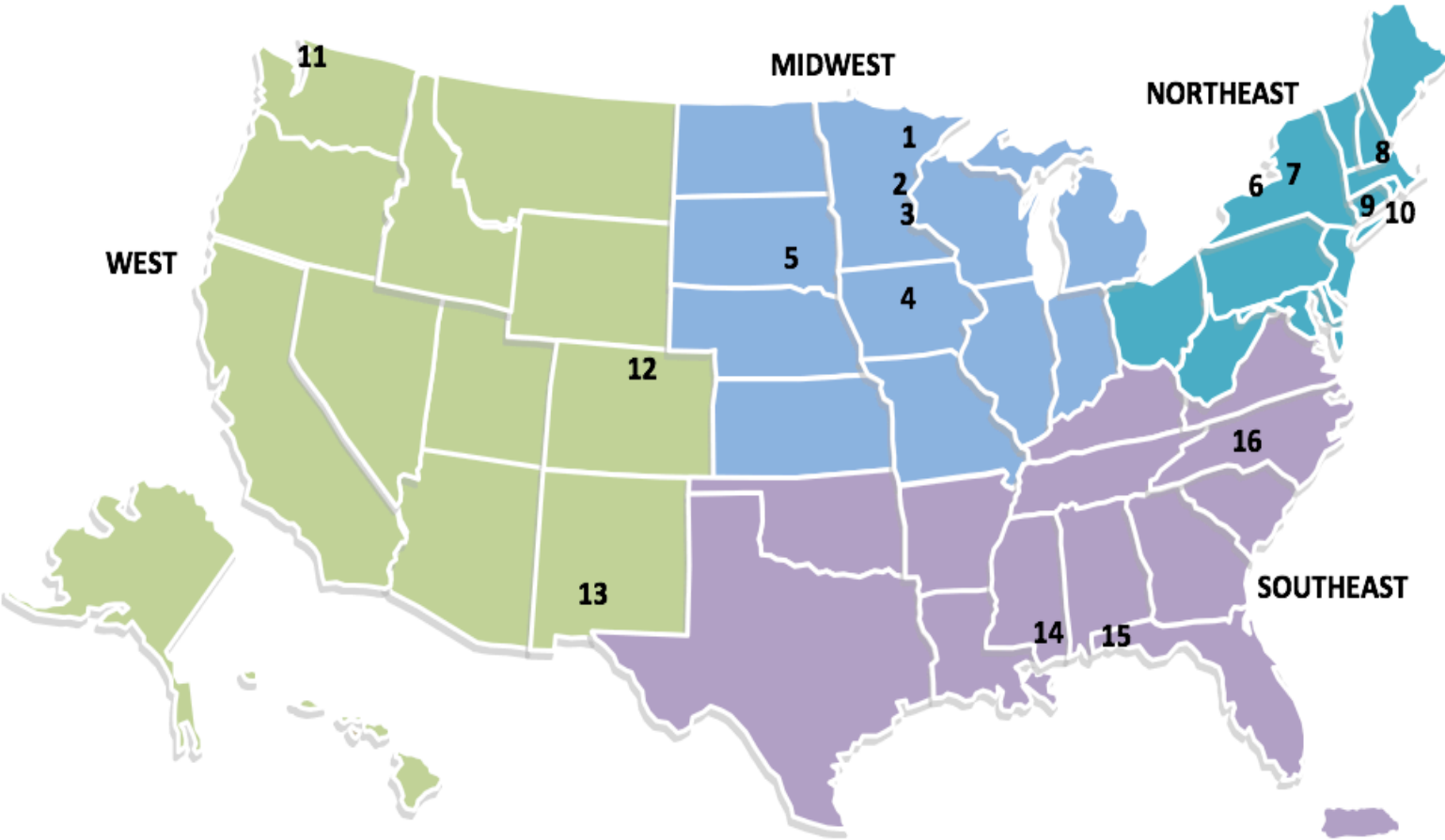
Learning Something New

Relevance and Connections to Everyday Life

Public Impacts Summative Evaluation: Main Findings



Partner Site Data Collection



Who did we speak with?



242 adult surveys

147 child surveys

35 observations

15 interviews

19 event
descriptions

ACTIVITY ENJOYMENT AND INTEREST

Families enjoyed and were interested in the *Explore Science: Earth & Space* activities.

Adults:

Almost all adults shared that their groups enjoyed (96%, n=242) and were interested (95%, n=242) by the activities.

Children:

Most children (86%, n=144) shared that the activities were “really fun.”

INTEREST AND CURIOSITY IN EARTH & SPACE TOPICS

Families were **more interested in and curious** about Earth & Space topics **after** trying the activities.

Adults:

Most adults (85%, n=238) reflected that their groups were **more** interested in Earth & Space topics **after** engaging with the activities.

Children:

Close to two-thirds of children (61%, n=142) shared that they were **more** curious about Earth & Space **after** trying the activities.

LEARNING SOMETHING NEW

Visitors felt their groups learned something new.

Almost all adults (91%, n=237) reflected that their groups **learned something new** at the activities.

RELEVANCE AND CONNECTIONS TO EVERYDAY LIVES

Earth & Space topics were more relevant for families after trying the activities.

Adults:

Most adults (72%, n=237) felt that Earth & Space topics were "more relevant" to their group's life and experiences **after** trying the activities.

Children:

Children shared that the activities reminded them of **space content** (33%, n=120), things they've done **at school** (20%), and **personal connections, memories or experiences** (11%).

Adults:

"She's still talking about it! She's really trying to get to the craters after this."

*"Children to learn that Earth protects them.
Ability to learn how magnetic fields surround us.
The crater activity, made us think of Crater Lake."*

*"He's really interested in space/telescopes.
Gives him a goal for his future...."*

Children:

"The moon and gravity."

"When I went to science at school."

"My friend's mom, because she studies space."

"My room."

"A book I read."

SUMMARY

Families **enjoyed and were interested** in the *Explore Science: Earth & Space activities*.

Families were **more interested in and curious** about Earth & Space topics **after** trying the activities.

Visitors felt their groups **learned something new**.

Earth & Space topics were **more relevant** for families **after** trying the activities.

THANK YOU

**Questions,
comments, or
experiences?**

Thank You!



This material is based upon work supported by NASA under cooperative agreement award numbers NNX16AC67A and 80NSSC18M0061.

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the view of the National Aeronautics and Space Administration (NASA).