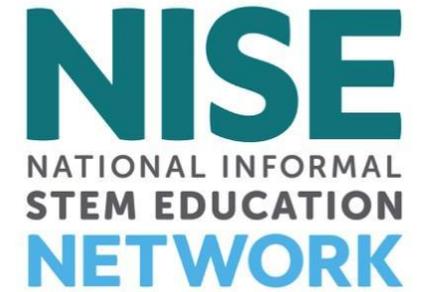


NISE Net Online Workshop

Reconnect and Re-engage with the NISE Network 2022 – an
Overview of Projects and Time to Connect

June 14, 2022



Today's Presenters:

Rae Ostman, Arizona State University

Breakout Group Discussions Led by:

Ali Jackson & Darrell Porcello

Claire Weichselbaum & Alyssa Johnson

Frank Kusiak & Christina Leavell

Nicholas Weller & Rae Ostman



Welcome!

As we wait to get started with today's discussion, please:

Introduce yourself! Type your name, institution, and location into the Chat Box

Questions? Feel free to type your questions into the Chat Box at any time throughout the webinar or use the raise your hand function in the participants list and we'll unmute your microphone.

Today's discussion will be recorded and shared on nisenet.org at: nisenet.org/events/online-workshop

Future Online Workshops

Tuesday, July 19, 2022

Tools for Engaging Communities and
Incorporating Diversity, Equity, Access,
and Inclusion Practices

Topics coming later this year...
(Dates TBA)

James Webb Space Telescope First Images
resources: <https://www.nisenet.org/webb>

2023 and 2024 Solar Eclipses
resources: <https://www.nisenet.org/solareclipse>

Learn more at [nisenet.org/events](https://www.nisenet.org/events)



NISE NATIONAL INFORMAL
STEM EDUCATION
NETWORK

Reconnect and Re-engage

2022

Workshop Overview

- **Introduction to the Network**
- **Opportunities to get involved**
- **Breakout group discussions**
 - 1 Changing Brains
 - 2 Digital Resources
 - 3 Climate Change
 - 4 Sustainability
- **Wrap-up**



Introduction to the NISE Network

NISE Network brings people together to **engage in STEM**, understand our world, and build a better future for everyone.



We create and share **products, practices, and materials** with partner organizations across the country.



Our resources

are available to everyone for free download from nisenet.org.

Hundreds of organizations participate in the NISE Network, including museums and universities.

Our community

includes educators,
researcher/evaluators,
and scientists.



Partner organizations use Network resources to engage learners in their communities.

Local implementation

brings people together to share and learn from each other.



Together we reach **millions of people** each year!



Our impact

grows through the efforts of our partner organizations.

Network projects tackle challenging problems and develop knowledge, tools, and practices.



Network relationships, knowledge, and infrastructure support a variety of projects.

Our projects focus on many areas of **STEM**.



Nanotechnology
2005-2017



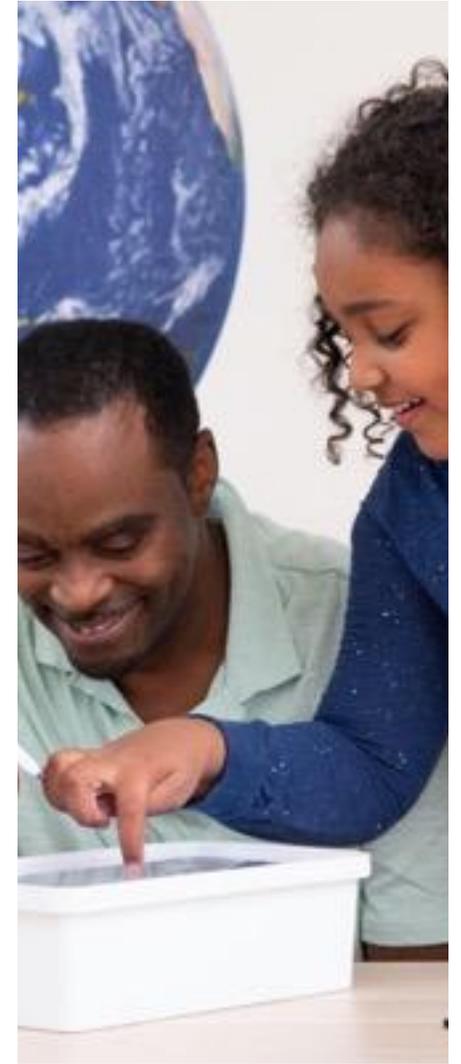
Synthetic biology
2014-2018



Chemistry
2016-2019



**Responsible
innovation**
2015-2019



Sustainability
2016-2017, 2019-2022

Projects provide **opportunities** to get involved.



Earth and space

2016-2023, 2022-2025,
2019-2022, 2020-2023,
2022-2024, 2022-2025



Changing brains

2018-2020, 2021-2023



Climate resilience

2020-2022



Radio waves

2020-2024

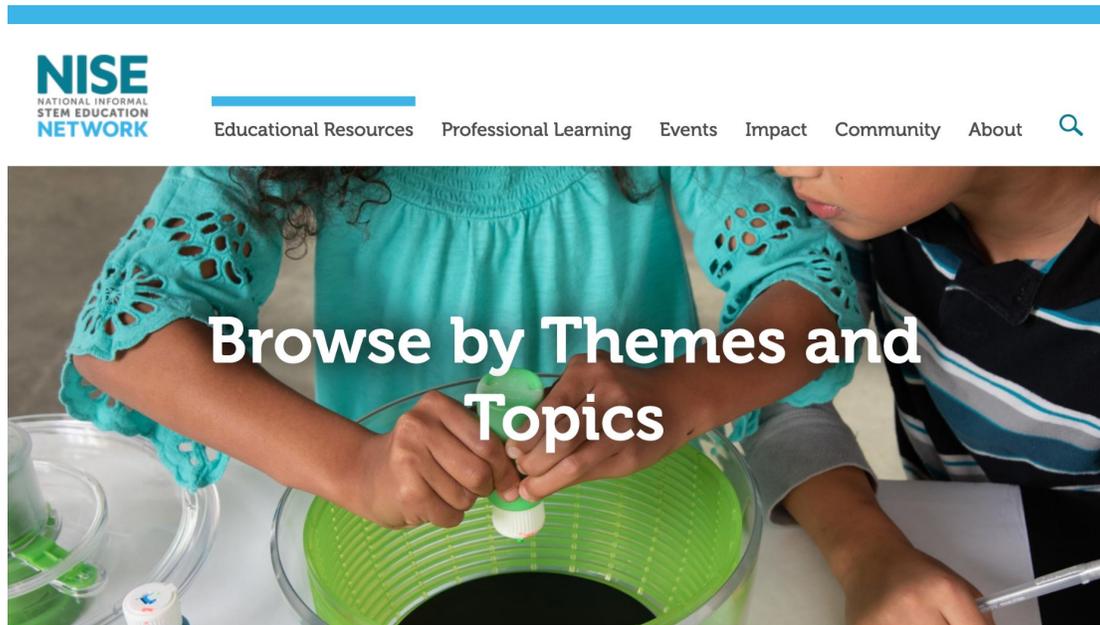


Learning ecosystems

2021-2025

Opportunities to get involved

Use our free resources on nisenet.org and howtosmile.org



nisenet.org/browse-topic



howtosmile.org/topics/athome

Earth & Space



EXPLORE SCIENCE
**Voyage through
the Solar System**



Mars Habitat (prototype exhibit)

New interactive component in 2023 for *Sun, Earth, Universe* exhibition



Voyage through the Solar System

New activities and app 2022-2024



Sparking Interest / Engaging Hispanic communities

New activities and exhibition in 2024-2025

Changing brains



CHANGING
BRAINS



Public brain data

A large scale neuroimaging study to understand language development that will produce a publicly available brain data set.

Studies of healthy individuals require trust in medical research systems, potentially valuing societal over individual benefit. As large datasets are shared, there are also issues of data privacy and consent.

TECHNOLOGY CARD



Mental illness diagnostics

A new, rapid, low-cost diagnostic tool that focuses on genetic and neurochemical correlates of symptoms.

Medical models of mental illness may reduce self-blame and increase seeking treatment, but reduce a person's belief in their own autonomy.

TECHNOLOGY CARD



Military general

You lead a specialized military unit that tests experimental technologies to protect soldiers in dangerous situations. You lost a leg during wartime and deeply understand the sacrifices soldiers make. Based on the emerging security threats all across the world you are especially interested in safe and long-term solutions to enhance mental and physical performance of those serving under you. Much of your unit's work is highly classified due to its sensitive nature.

STAKEHOLDER CARD



Video game designer

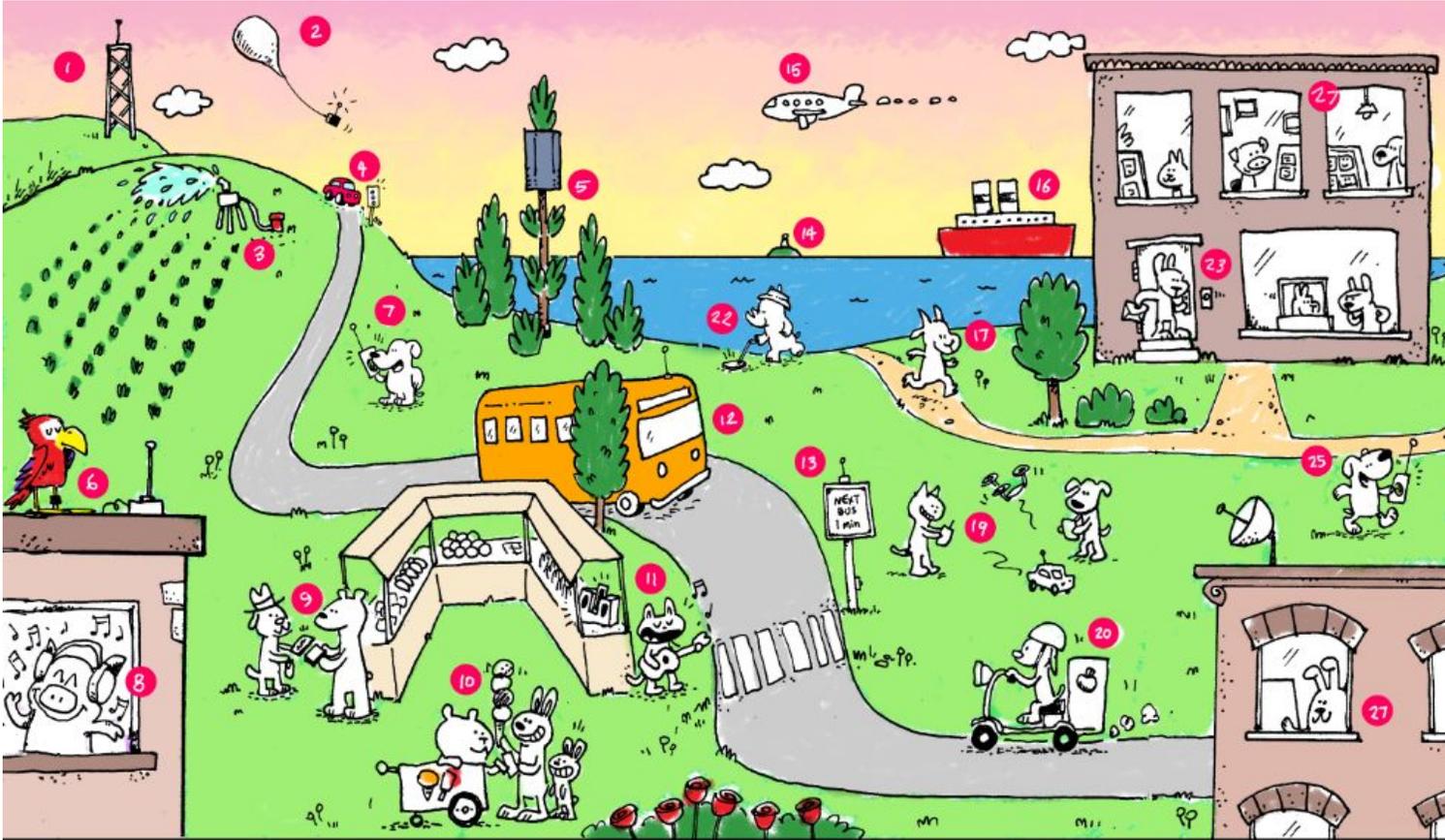
After an injury suffered in a car accident, you became paralyzed from the neck down. Your injury causes chronic pain and you wonder how research might lead to future treatments. Recently you learned about the Cybathlon, an international competition that helps develop assistive technologies for people with disabilities, and you're interested in getting involved with the brain-computer interface event.

STAKEHOLDER CARD

Neuroscience, ethics, and technologies

Hands-on activities in 2023

Making Waves with Radio



WHAT CAN YOU FIND IN WAVETOWN?

1. radio tower
2. weather balloon
3. smart sprinkler

4. self-driving car sensors
5. cell tower
6. radio tracker on bird
7. walkie talkie
8. bluetooth headphones

9. contactless payment with phone
10. contactless payment with RFID
11. radio playing music
12. bus with onboard wi-fi
13. bus stop with digital display

14. tsunami detection buoy
15. avionics navigation system
16. maritime traffic control
17. fitness tracker
19. remote control toys

Radio Explorers

Radio Silence

Try this!

1. First, lay out a selection of items. Turn on the radio and tune to a station. **How does the radio signal sent from a station's transmitter miles away get to your device?**
Tip: After a station has been selected, place a piece of tape over the tone and volume dials so they do not change during the experiment.
2. Try making a shell of wrapping materials around your device or placing it in a container. Try to block the signal! **Which materials work best at blocking the radio waves?**
3. What changes when you raise or lower the antenna? Does your shell have to cover the whole radio or just part of it to affect the radio waves? Try touching the radio inside your container. What happens? **Are you surprised?**
4. Now, try testing your shell again with another radio device, like a Bluetooth speaker or a walkie-talkie. **Is it easier or harder to block the signal to these devices? Do the same materials work?**

Radio waves transfer energy that can be reflected or absorbed, or pass through materials.

Radio waves are all around us and invisible. Radio waves are a type of electromagnetic radiation, a kind of energy, like the daylight we can see or the microwaves that cook our food. Some materials that conduct electric current, like metal, can be used to reflect and absorb radio waves. These materials can be used to make a Faraday cage, which protects people and equipment from electromagnetic radiation or actual electric currents, like lightning strikes. Because Faraday cages interfere with radio waves, they will disrupt the normal function of devices that receive or transmit radio waves—like radios, cell phones, Bluetooth speakers, or walkie-talkies. Did the Faraday cage you made in this activity completely block signals to all the devices you tested?

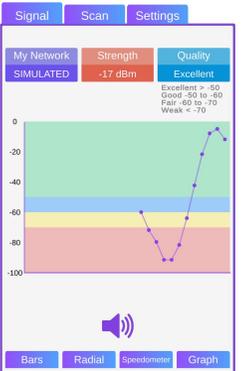
A woman in a Faraday cage talks her hand up to an electronic ball without getting shocked.

There are many uses of radio technologies in modern communications, from broadcasting a band's latest song on a radio station to receiving important navigation signals from a satellite. To prevent a giant mix-up of radio waves and their functions, different devices use different radio frequencies. Low radio frequencies have longer radio wavelengths, while high radio frequencies have shorter radio wavelengths. These differences are why we can receive cell phone calls inside a building, but not inside an underwater tunnel, or why AM radio signals can get lost going under overpasses, but FM radio keeps working. The choice of materials for your Faraday cage may allow you to examine some of the differences in radio waves used by various communication devices.

Engaging the Public in Radio:

Key Concepts in the Science, Engineering, and Social Impacts of Radio Frequency Technologies

Signal Sniffer



Learner resources

Craft-based toolkit and digital apps in 2023

Professional resources

Online PD and activity guides in 2023

STEM learning ecosystems



STEM LEARNING
ECOSYSTEMS



Principles and practices of community-wide learning ecosystems

Professional development in 2024

Breakout groups
20 minutes
(can switch halfway through)

Breakouts



CHANGING
BRAINS



EXPLORE SCIENCE
**Voyage through
the Solar System**



**SUSTAINABLE
FUTURES**

- **#1 Changing Brains**
Learn about the Changing Brains project and explore how neuroscience and neuroethics might fit into your work.
(Claire Weichselbaum & Catherine McCarthy)
- **#2 Digital Resources**
Several future projects will only share resources digitally (no physical kits). How do we make digital materials as useful as possible? How can we improve so materials are actually used?
(Ali Jackson & Darrell Porcello)
- **#3 Climate Change**
How are you engaging your communities about Climate Change? Where are you having trouble? How can we support each other?
(Frank Kusiak & Christina Leavell)
- **#4 Sustainability**
Discuss sustainability successes and opportunities you see in your work and brainstorm ways those opportunities could be built on.
(Nicholas Weller & Rae Ostman)

Welcome Back!



Projects and Opportunities



EXPLORE SCIENCE
**Voyage through
the Solar System**



CHANGING
BRAINS



STEM **LEARNING
ECOSYSTEMS**



EXPLORE SCIENCE
Earth & Space

Making Waves

Hands-on activities, mobile apps, and camp curriculum on the science, technologies, and societal implications behind radio wave communications.

- Free digital materials **coming in 2023**: www.nisenet.org/making-waves-with-radio
- Funding: NSF through BSCS Science Learning

Voyage through the Solar System

Hands-on activities, DIY apps, and training materials about our solar system and human space exploration; 350 kits to past Explore Science: Earth & Space kit recipients (2023).

- Funding: NASA through Sciencenter
- Free digital materials **coming in 2023**: www.nisenet.org/voyage-solar-system

Changing Brains

An evolving project for public and professional audiences to talk about personal, community, and societal connections of brain research and related technologies.

- Free digital materials **coming in 2024**: www.nisenet.org/brain
- Funding: the Dana Foundation, The Kavli Foundation

STEM Learning Ecosystems

Professional resources to support lifelong learning using principles and practices of successful STEM Learning Ecosystems.

- Free digital materials **coming in 2024**: www.nisenet.org/stem-learning-ecosystems-project
- Funding: NASA through Arizona State University

Explore Science: Earth & Space

Professional learning and public engagement resources about Earth and space science; 350 toolkits distributed in 2017-2020; Moon Adventure Game distributed in 2020.

- **Webb Space Telescope resources**: www.nisenet.org/webb
- **Solar Eclipses October 14, 2023 & April 8, 2024**: www.nisenet.org/solareclipse
- Free digital materials: www.nisenet.org/earthspacekit & www.nisenet.org/moongame
- Funding: NASA through Arizona State University and Arizona Science Center



Sustainable Futures

Professional development and public engagement resources about sustainability (2019-2022); hands-on activities and training materials (2016, 2020).

- Free digital materials: www.nisenet.org/sustainability
- Funding: Rob and Melani Walton Foundation and IMLS through Arizona State Univ.

Howtosome.org At-Home Activities Collection

- Professional resources, framework, and hands-on STEM activities created by a cohort of NISE Network partner museums to support at-home learners (2021-2022).
- Free digital materials: howtosome.org/topics/athome
- Funding: IMLS through Children's Creativity Museum

Citizen Science, Civics, and Resilient Communities (CSCRC)

Forums and citizen science projects about resilience planning related to heat waves, sea level rise, extreme precipitation, and drought (2020-2022).

- Free digital materials: www.nisenet.org/CSCRC
- Funding: NOAA through Museum of Science

Explore Science: Let's Do Chemistry

Public engagement resources designed to stimulate interest, sense of relevance, and feelings of self-efficacy about chemistry; 250 kits distributed in 2018.

- **National Chemistry Week every October** www.nisenet.org/ncw
- Free digital materials: www.nisenet.org/chemistry-kit
- Funding: National Science Foundation through Museum of Science

Sun, Earth, Universe exhibition

The *Sun, Earth, Universe* exhibition is an engaging and interactive museum exhibition about Earth and space science for family audiences; 52 exhibitions distributed 2018-19.

- **Build a Mars Habitat coming in 2023** www.nisenet.org/mars-habitat-project
- Learn more: www.nisenet.org/sunearthuniverse **Contact us about waiting lists**
- Funding: NASA through Arizona State University & Science Museum of Minnesota

The logo for Frankenstein 200, featuring the word "FRANKENSTEIN" in a bold, sans-serif font with "200" as a superscript to the right.The logo for NanoDays, featuring the text "NanoDays" in white on a purple background, with the tagline "The Biggest Event for the Smallest Science!" in a yellow box below it.

Frankenstein200

Hands-on activities that promote creativity and reflection about responsible innovation, inspired by themes in Mary Shelley's *Frankenstein*; kits distributed in 2017.

- Free digital materials: www.nisenet.org/frankensteinkit
- Funding: National Science Foundation through Arizona State University

Building with Biology

Hands-on activities and public forums designed to promote conversations among scientists and public audiences about synthetic biology; 200 kits distributed in 2016.

- Free digital materials: www.nisenet.org/building-with-biology-kit
- Funding: National Science Foundation through Museum of Science

NanoDays

Hands-on activities and professional development resources about nanoscale science, engineering, and technology topics; 250 kits distributed in 2008-2015.

- Free digital materials: www.nisenet.org/nanodays
- Funding: National Science Foundation through Museum of Science

Nano Exhibition

Nano is an interactive, small footprint exhibition that engages family audiences in nanoscale science, engineering, and technology; 93 exhibitions distributed 2011-14.

- Learn more: www.nisenet.org/nano-mini-exhibition [Contact us about waiting lists](#)
- Funding: National Science Foundation through Museum of Science

Making Earth & Space Science More Relevant and Inclusive

Making Earth & Space Science More Relevant and Inclusive

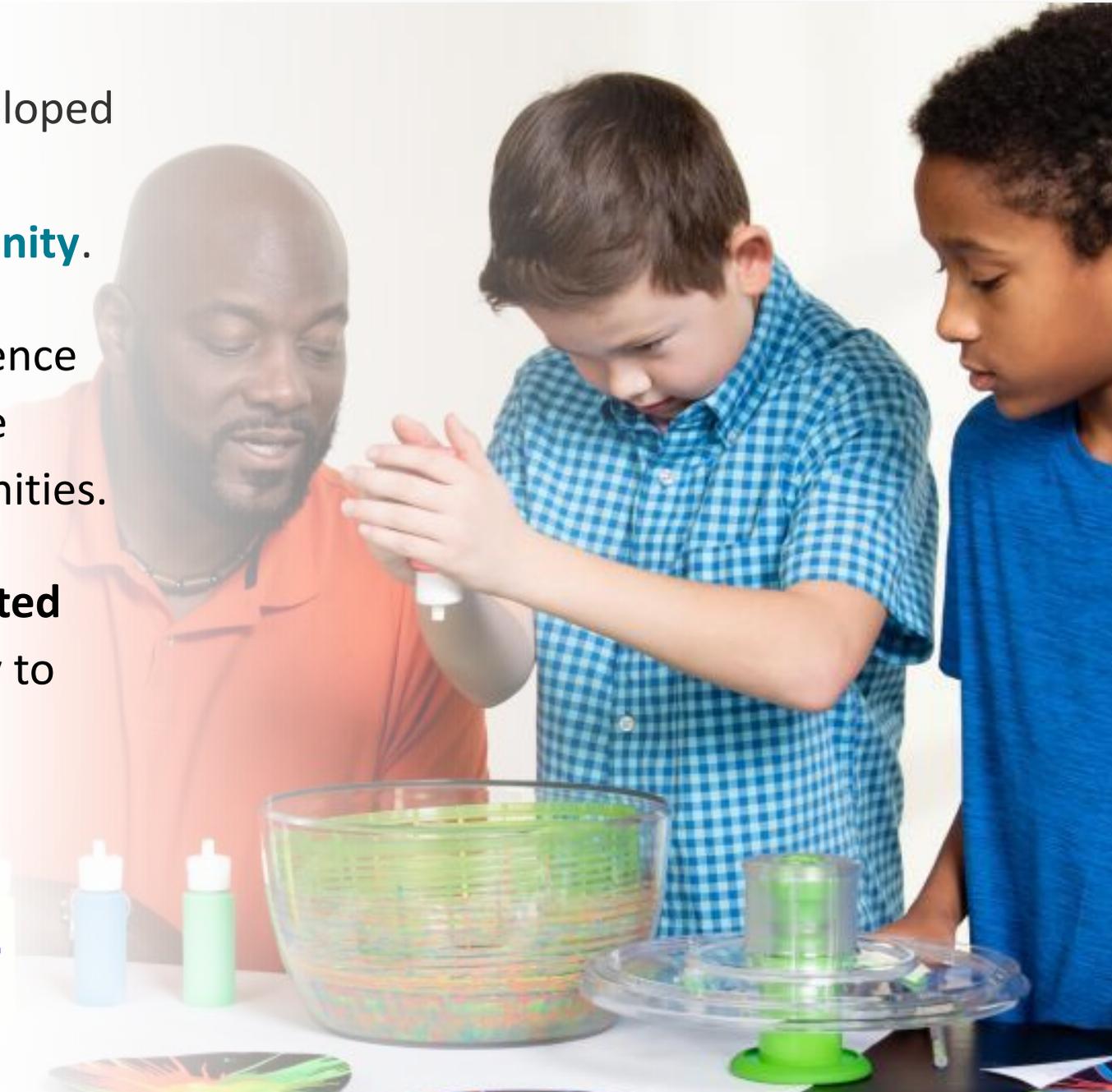
A self-paced course based on resources developed for the NISE Network's **Earth & Space Project-Based Professional Learning Community**.

Resources designed to help museum and science center educators make Earth & Space science **relevant and inclusive** for their local communities.

Written materials, slides, and videos presented during this virtual online learning community to explore at your own pace.

Learn more:

nisenet.org/making-relevant-inclusive



Get Involved

Learn more and access the
NISE Network's online digital resources
nisenet.org



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monthly newsletter**
nisenet.org/newsletter

Follow NISE Net on social networking
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Thank you



Support from the National Science Foundation: *Nanoscale Informal Science Education Network* (#0532536, #0940143), *Multi-Site Public Engagement in Science* (#1421179), *Increasing Learning and Efficacy about Emerging Technologies* (#1516684), *ChemAttitudes* (#1612482), *Wireless Radio Communications* (#2005784), *Co-Created Public Engagement with Science* (#1811118). Any opinions, findings, and conclusions or recommendations expressed in this presentation are those of the authors and do not necessarily reflect the views of the Foundation.



Support from NASA: *Space and Earth Informal STEM Education* (#NNX16AC67A, #80NSSC18M0061), *Moon and Beyond* (#80NSSC18K1219), *Build a Mars Habitat* (#80NSSC20M0030), *SciAct STEM Ecosystems* (#), *Destination Moon* (#80NSSC21M0082), and *Engaging Hispanic Communities*. 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).



Support from NOAA: *Citizen Science, Civics, and Resilient Communities* (#NA18SEC0080008)



Support from IMLS: *Sustainable Museums* (#MG-245910-OMS-20) and *How to Smile* (#CAGML-246996-OMLS-20).



Support from Rob and Melani Walton Foundation: *Sustainability in Science and Technology Museums*.



Support from The Kavli Foundation: *Changing Brains*.



Support from Dana Foundation: *Barbara Gill Civic Science Fellowship*.

Q&A

Questions from You!

Physical Materials

- a. Facilitation guides suggest sources for materials
- b. Currently have extra supplies for...
 - i. Space Guess Quest game boards
 - ii. Design, Build, Test activity foam pieces (same pieces used in the Sun, Earth, Universe exhibition)
 - iii. Sun, Earth, Universe exhibition wooden rover sets for the Mars play table

More Questions from You

1. Fostering collaborations - ways to connect with other network members
2. Ideas for implementing STEM in small museum spaces
3. Successful programming for Makerspaces