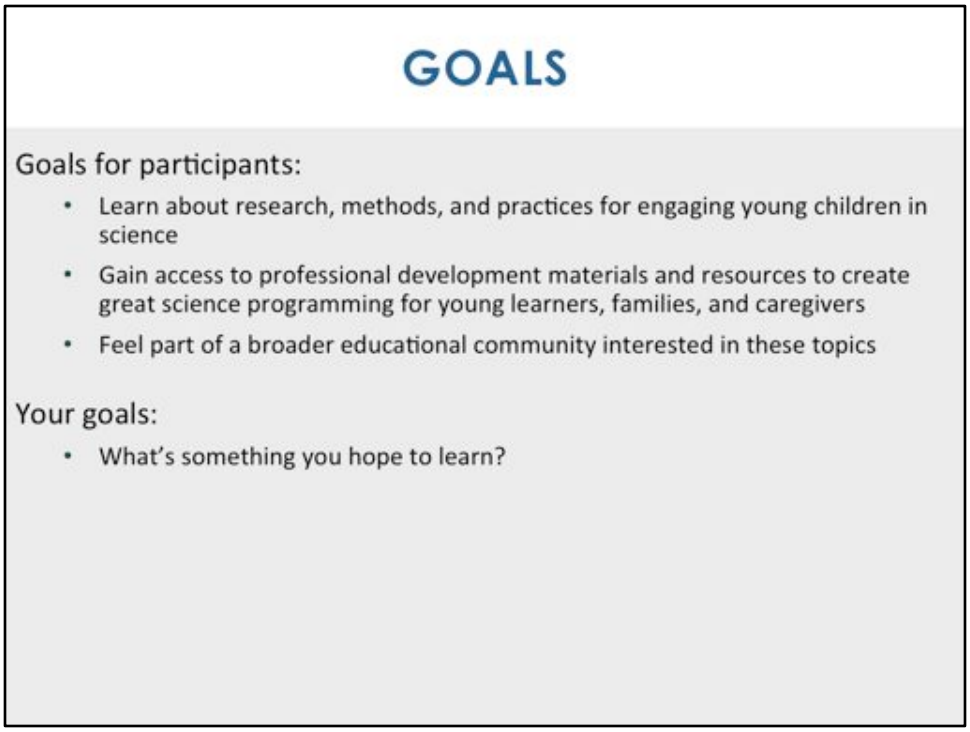
Ali Jackson, Sciencenter (National Informal STEM Education Network)
Lisa Regalla, Bay Area Discovery Museum (Center for Childhood Creativity, and Creativity Catapult)
Bethany Resnick, Sciencenter (Collaborative for Early Learners)
Christina Carlson, Saint Louis Science Center (Science Beyond the Boundaries' Early Learners Collaborative)



Show of hands:
Who's already doing early childhood?
Who's interested in starting a program?
Who does some professional development around early childhood?

Investigate Your Mystery Eggs!

Ignite your curiosity and practice scientific ways of thinking.

1. Work in pairs or small groups.
2. Pick an egg. Shake it, smell it. What can you discover about what's inside without opening the egg? *No peeking or prying!*
3. Write or draw what you think might be inside. Compare your ideas.
4. What science process skills did you use to investigate the egg?

Mention activity extension to reverse engineer eggs.

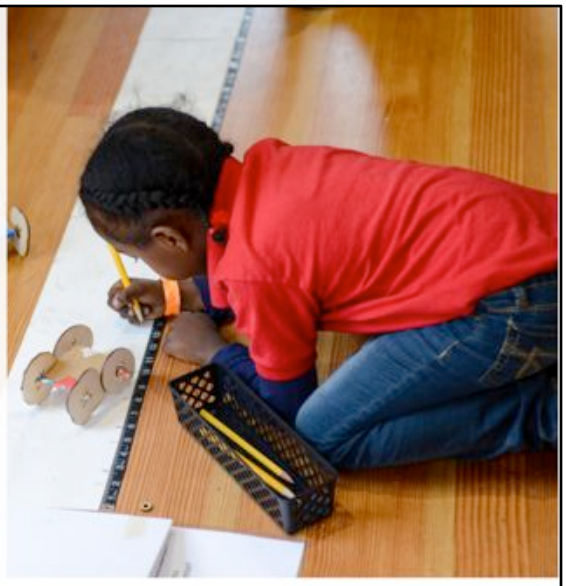
Debrief questions:
How was that for you? How did it feel not knowing the answer?
What was it like to first have time to experiment?
Did you feel curious? How did it feel to be curious?
What was it like when you got to represent your ideas on paper?
What was it like to share your ideas with your neighbor and work together to figure out what was inside?
Did you practice any early science skills?

The Roots of STEM Success:

Changing early learning experiences to build lifelong thinking skills

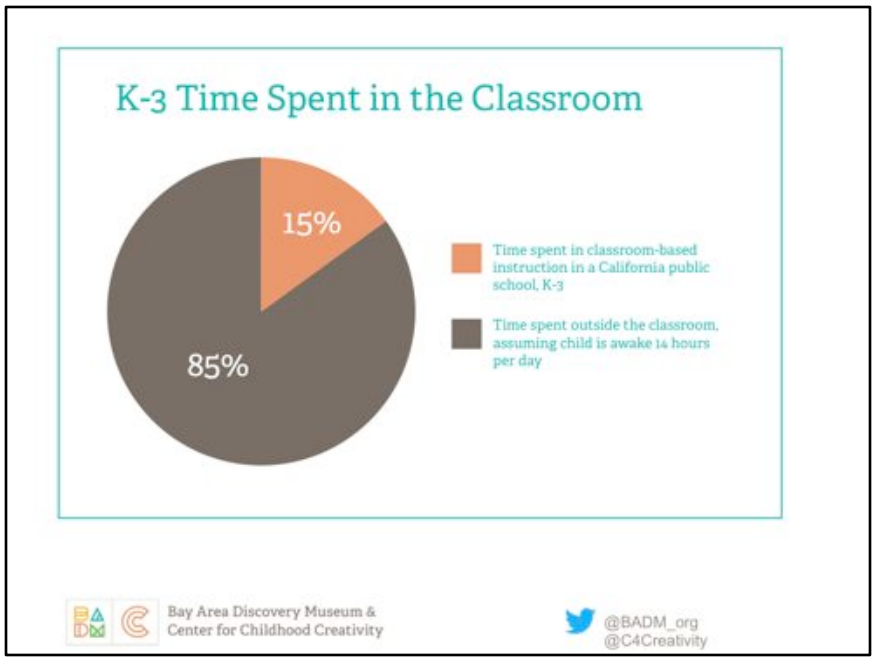
Lisa Regalla, Ph.D.
Deputy Director,
Center for Childhood Creativity
Bay Area Discovery Museum

@Regallium



Bay Area Discovery Museum &
Center for Childhood Creativity

@BADM_org
@C4Creativity



All children need the underlying thinking dispositions and knowledge to succeed in a STEM-driven economy and world.

These thinking skills and dispositions are best built when brain architecture is laid.

Finding 1: STEM thinking begins in infancy

Research indicates that babies are wired for:

- Causal learning
- Statistical inference

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Intuitive statistics in infants

Adapted from Xu & Garcia (2008)

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Finding 2: More play leads to better STEM thinking

- Play builds reasoning skills
- Combining exploration and explanation deepen these skills
- Guided play especially helpful for content learning

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A powerful combination for problem solving

Legare, (2014)

Explanation

Asking children to explain how things work deepens reasoning about cause and effect.

Exploration

When children encounter something unexpected, they engage in more exploratory play to discover how things work.

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Finding 3: STEM and language learning develop in tandem

- Science talk promotes conceptual understanding
- Spatial language boosts spatial reasoning
- Exposure to vocabulary reduces "cognitive load"

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Finding 4: Active, self-directed learning builds STEM skills

- Active learning helps children grapple with abstract ideas.
- Self-directed inquiry builds lifelong interest.

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Finding 5: Mindset matters to STEM success

- Changes in growth mindset over the elementary years
- Mindset influences STEM achievement
- Shaping mindsets

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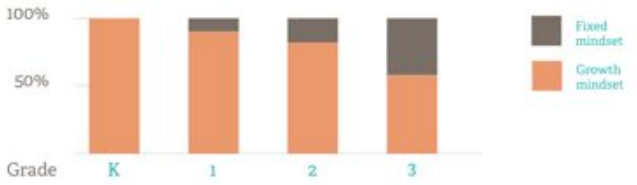
Changes in growth and fixed mindset across grade levels



Adapted from Ricci (2013)

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Finding 6: Adult support and EF skills promote abstract reasoning

- Categorization as evidence that children can reason abstractly
- Executive function aids in theory revision

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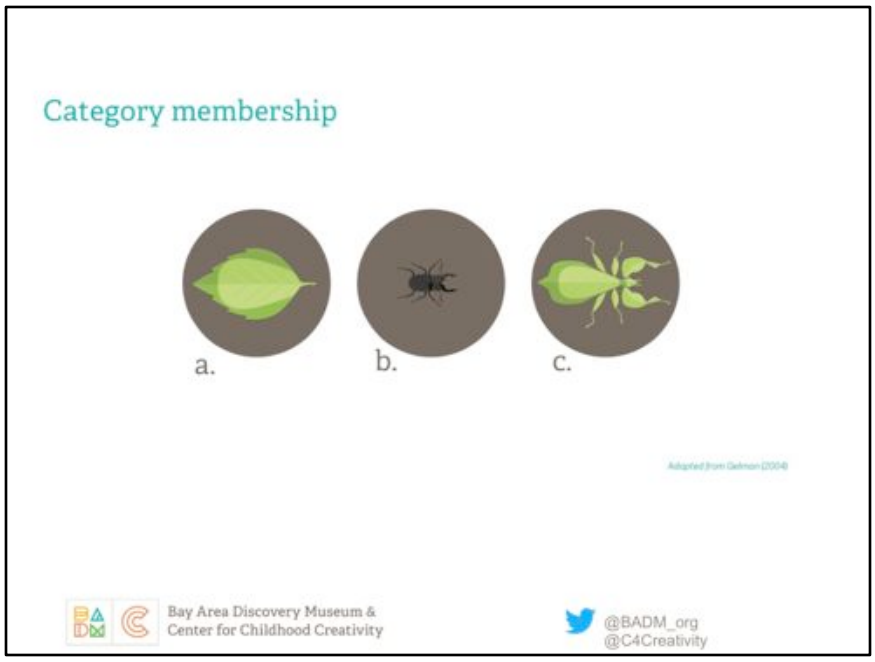
Replace photo



Tonya is creating a slide version of this infographic (better resolution)


CenterForChildhoodCreativity.org
CreativityCatapult.org
Bay Area Discovery Museum &
Center for Childhood Creativity
@BADM_org
@C4Creativity

Hi, my name is Bethany and Im from the Sciencenter in Ithaca NY and were a part of the Collaborative for Early Science Learning.

The Collaborative for Early Science Learning (CESL) is collaboration between 6 museums across the country that all partner with their local Head Start. The goal of this partnership is to come up with best practices for working with head start when offering professional development and supplementary family engagement programming. This collaboration has really helped us see how different institutions work with their partners and what kind of programming different sites offer. Through sharing these different programs we have been able to create a variety of resources to help other museums with their partnerships and programming. We have created an online toolkit which has a variety of different resources. I will be going over this a little bit later.

Im going to be talking a little about why community partnerships in general, as we have partnered not only with Head Start but other early childhood institutions as well.

Lets take a minute to think about why museums should consider community partnerships. Museums are a local resource when it comes to science and these partnerships may help other other community member not only see it that way, but perhaps take advantage that its open to the public.

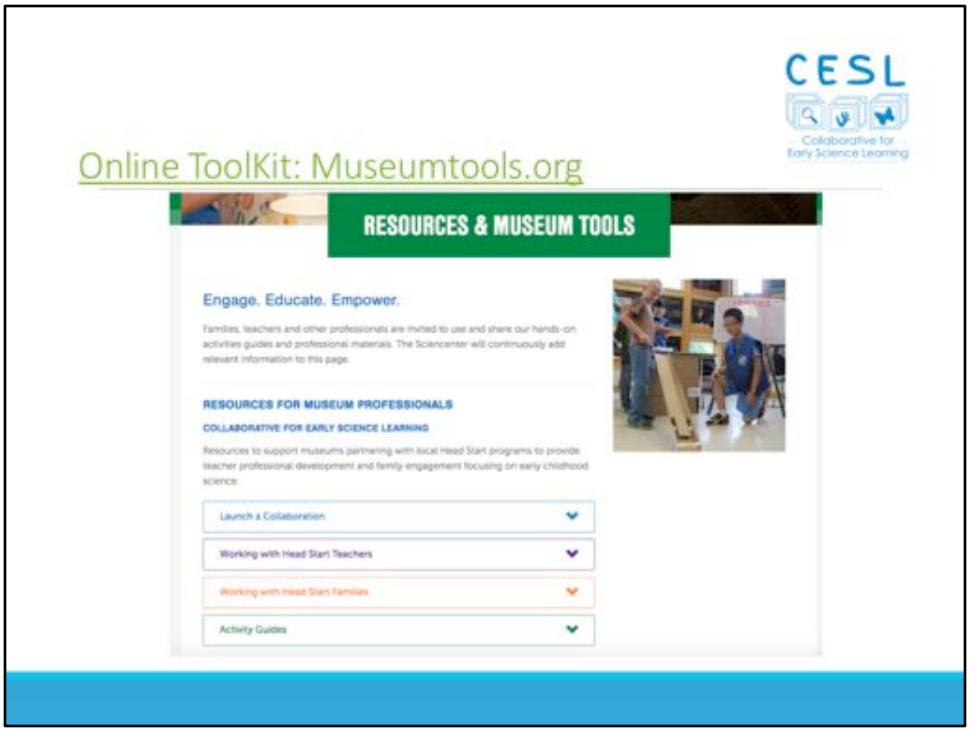
Many employees at museums are trained at engaging adults and children in science activities. As an educator at a museum I have spent hours working with families and learning tips and tricks on getting both the children and parents involved. With employees that have this skill set its easy to see why museums should working with community members in a variety of different capacities and getting people engaged in science.

Institutions can offer a variety of programming to the community including professional development and family programing. Museums are well suited for PD because we have experience working with science and understand how to make science seem accessible. PD is also great because many people find science intimidating or think they need special training and we are well equip to show them how easy science can be and how best to do it with children and families.

Now that we have kind of introduced the idea of community partnerships Im going to talk a little about about some of the components of a partnership. One really important part of a partnership is a common goal. For our partnership, our goal was to help HS teachers become more comfortable with science, and we do this through professional development and family programming. Talking with our partners and really focusing on what we wanted to accomplish and planning out how we were going to do that makes for a really strong partnership.

Another really important part of our partnership is that we have the support of the manager. They know that this is something that's important and the teachers know that they will have support when bringing the activities back to the classroom. This is really important because we want these curriculum to be implemented and it makes a different when the teachers know that they have that support from their institution.

Along those same lines, how partners contribute financially towards their pd and family programming. This solidifies that it is actually a partnership and they think it is valuable enough for them to allocate funds towards programming.



Now that we have talked a little about what CESL is and why partnerships are important, Im going to talk a little more about our resources to help start those community partnerships, both with head start and other early childhood institutions.

CESL
Collaborative for Early Science Learning

Thank you!

- Bethany Resnick
- bresnick@sciencenter.org


Early Learners Collaborative
Science Beyond the Boundaries Network
SCIENCE BEYOND the BOUNDARIES
SAINT LOUIS SCIENCE CENTER

About the Collaborative

- 21 museums from across the world
- Focus on connecting both large and small museums to share and co-develop best practices in early childhood museum education
- Creation of yearly early childhood handbook and resources

SCIENCE BEYOND the BOUNDARIES

SAINT LOUIS SCIENCE CENTER

Goals

- To leverage and expand upon science centers' existing strengths in hands-on, learner-centered programming, thereby helping to prepare our youngest visitors for school.
- To bring cutting-edge child development and school readiness research into preschool programming at science centers, large and small.
- To support rapid idea-sharing and adaptation between children's museums and science centers, between small museums and large museums, and among museums around the world.

SCIENCE BEYOND the BOUNDARIES

SAINT LOUIS SCIENCE CENTER

Handbook

SCIENCE
BEYOND
the BOUNDARIES

SAINT LOUIS
SCIENCE
CENTER

Preschool Program Checklist

- ❑ Are you addressing social-emotional, cognitive, and physical development?
- ❑ Are the experiences open-ended?
- ❑ Do your environment and materials include a mixture of familiar and new things?
- ❑ Are the parents and staff co-explorers, not experts?
- ❑ Do you encourage children to play with science?

SCIENCE BEYOND the BOUNDARIES

SAINT LOUIS SCIENCE CENTER

Professional Development Checklist

- ❑ Ensure content is grounded in current early childhood learning research.
- ❑ Create dedicated time for attendees to network and connect with their peers.
- ❑ "Field trips" and/or experiences outside a classroom setting are important!
- ❑ Keep the day short to allow time for travel in morning and afternoon.

SCIENCE BEYOND the BOUNDARIES

SAINT LOUIS SCIENCE CENTER

Activities

SCIENCE BEYOND the BOUNDARIES

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Network

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Connect With Us!

Early Learners Collaborative Resources:
www.sciencebeyond.org/early-learners-collaborative/

Stop by the Grandstand Booth for
Great Ideas Under $1000
Booth 206 in the Exhibit Hall

SCIENCE BEYOND
the BOUNDARIES

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Thank you!

Christina Carlson
christina.Carlson@slsc.org

SCIENCE BEYOND the BOUNDARIES

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NISE
NATIONAL INFORMAL
STEM EDUCATION
NETWORK
nisenet.org

Considerations:
We can do things together that are difficult for an individual organization to do (working at scale, rigorous process for current science).
We choose projects that accomplish network goals, that we know partners are interested in, and we have the capacity to develop and implement at scale.
From a practical point of view, someone needs to find the funding and lead the project.

NISE Net supports **informal learning about STEM** in communities across the United States.

Partner organizations use Network resources to engage audiences in their communities. **Local collaborations** increase our reach and impact.

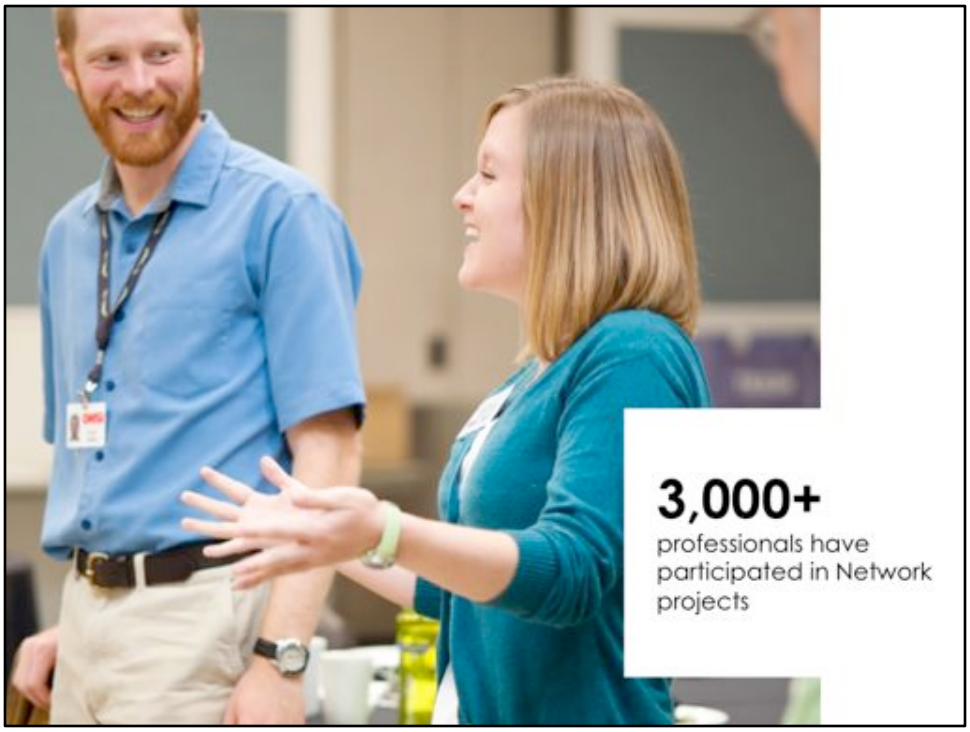
Partner organizations use Network resources to engage audiences in their communities.

And other early childhood programs at partner institutions


IMPACT

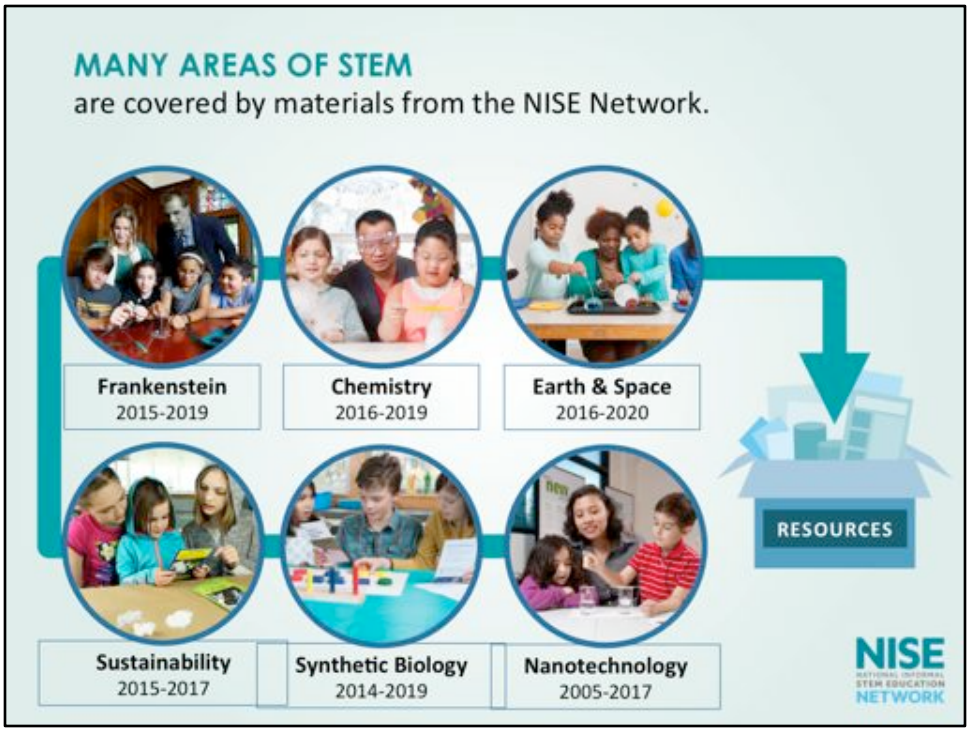
50,000,000+

people have been reached through Network projects


3,000+
professionals have participated in Network projects


50
states have active
Network partners

PROJECTS



Each project has its own funding source, leadership team, work teams, collaborators, advisors, participants, and requirements

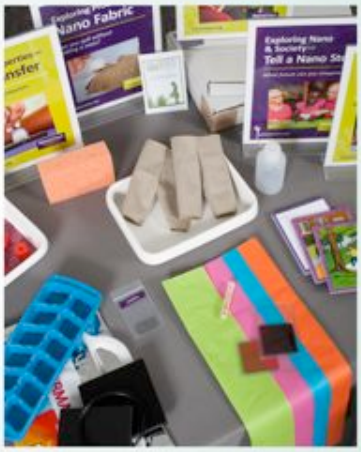

PRODUCTS

Over the next few slides I'll share mostly what's included in each toolkit that we provide

KIT CONTENTS

Each kit includes:

- hands-on activities
- posters, media, and graphics
- event planning materials
- training videos



All resources are available for free download at **nisenet.org**

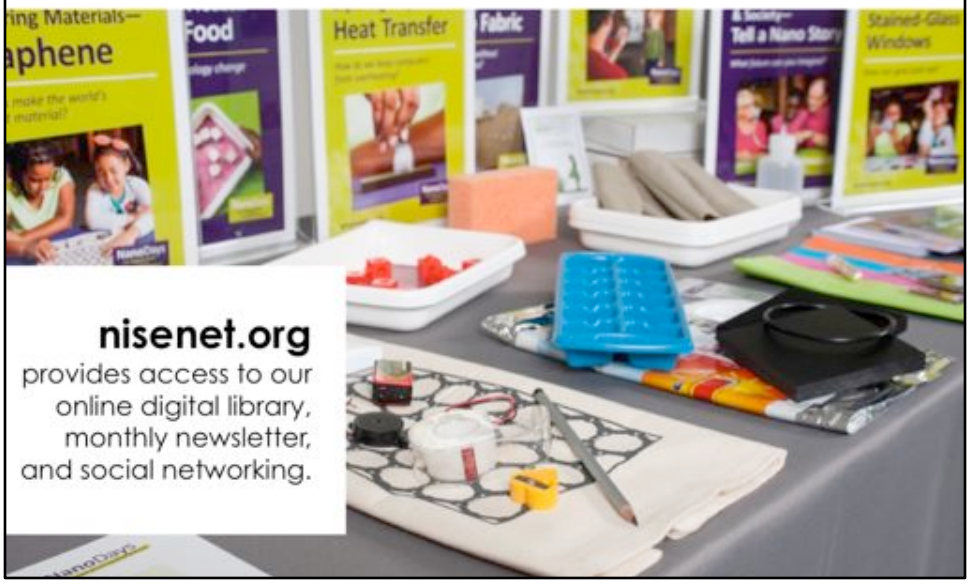
KIT CONTENTS

Each activity includes:

- all necessary materials
- step-by-step instructions
- facilitator guide & background info
- activity sign

All resources are available for free download at **nisenet.org**

Network resources are open source and freely available to use and adapt.



nisenet.org
provides access to our online digital library, monthly newsletter, and social networking.

CORE ACTIVITY CHARACTERISTICS

Social: Fosters positive social interactions

Multigenerational: Offers challenges that are fun for all ages

Straightforward: Easy to understand to quickly and easily engage participants

Aligned: Interactive aspects are directly related to the learning objectives

PROGRAM DEVELOPMENT

Create prototype

- Research online
- Find successful examples
- Try things out

Get input

- Educators
- Experts
- Participants

Test systematically

- Traditional eval
- Reflective practice
- Team-based inquiry

Make improvements

- Strengthen learning
- Polish materials

EXPLORE SCIENCE: EARTH & SPACE

EXPLORE SCIENCE
Earth & Space
La Tierra y el Espacio

Applications for the 2019 toolkit is now open, toolkits are free so please apply!

NISE Network

ASTC Partner Breakfast:
Monday, 7:30-9am
Marriott Hartford Downtown
Marriott Rooms A/B
NO RSVP required, all are welcome.

Website:
nisenet.org

Newsletter:
nisenet.org/newsletter

Social media:
nisenet.org/social

nisenet.org

READY-TO-USE RESOURCES

Professional development guides
Program templates
Evaluation tools
Training slides and videos
Improv exercises
…and more!

MANY TOPICS

Programs, activities, games
Presentation skills
Partnerships and collaborations
Universal design
Team-based inquiry
…and more!

Ali Jackson
ajackson@sciencenter.org

NISE NETWORK
NATIONAL INFORMAL STEM EDUCATION

This material is based upon work supported by NASA under cooperative agreement award number NNX16AC67A and by the National Science Foundation under Award No. 1612482.

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) or the Foundation.

What made you feel excited?

Share something new that you learned and plan to bring back and share with colleagues?

What made you feel energized?

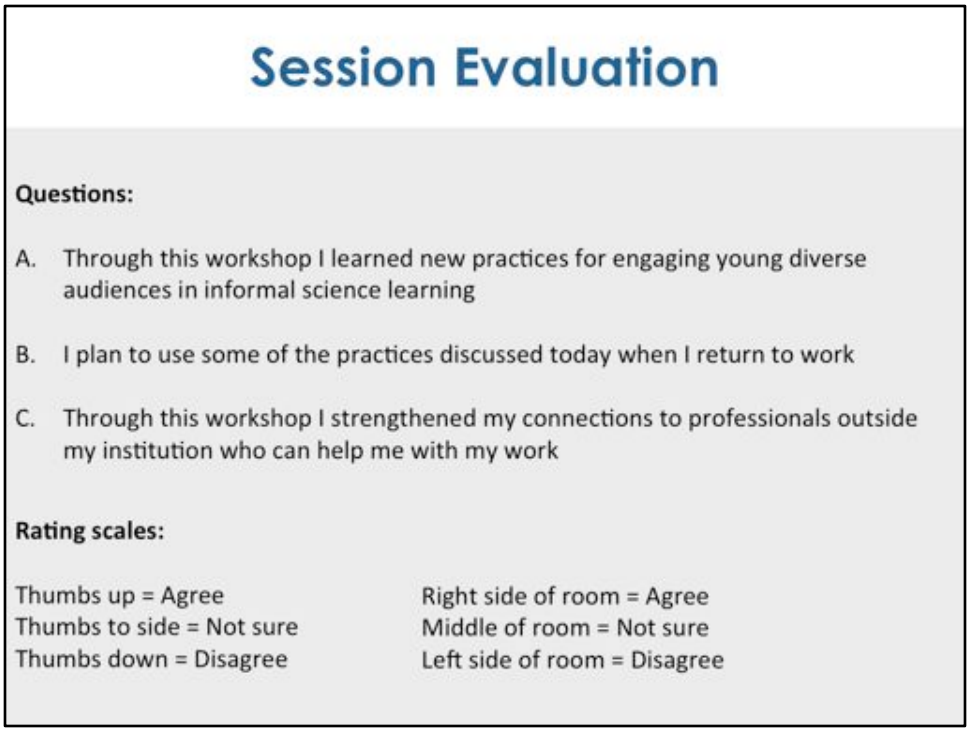
How do you plan to do more (or some) early childhood science back home?

What made you feel curious?

What's a question you're asking yourself? What are you wondering about? What resources can you use to follow-up?

Featured Resources

- www.CenterForChildhoodCreativity.org
- www.CreativityCatapult.org
- www.museumtools.org
- www.sciencebeyond.org/early-learners-collaborative/
- www.nisenet.org



ASTC Survey!
Modeling TBI, we can evaluate this workshop!

THANK YOU