

Partnerships and programs to broaden participation in STEM: Insights for action from NASA's SciAct program

SLECOP | May 1, 2023



STEM LEARNING
ECOSYSTEMS

Goals and Agenda



Goals

1. Meet members of other ecosystems and **share and learn** with them throughout the design session
2. Strengthen your **understanding of DEIAB** (diversity, equity, inclusion, accessibility and belonging) and the ways that these concepts apply to STEM learning ecosystems
3. Learn about, discuss, and **apply findings** from a study of four learning ecosystems designed to broaden participation in STEM
4. Outline an **action plan** to apply or implement these ideas when you return home
5. Help **inform us** – we are a collaboration of four ecosystems that participate in NASA's Science Activation program

Agenda

Part 1 - STEM learning ecosystems 10:45am-11:45am

- **Welcome:** Overview and introductions
- **Learn:** Characteristics of ecosystems designed to broaden participation
- **Reflect and share:** Draw your ecosystem's key characteristics

Lunch break 11:45pm-2:40pm

Part 2 - Broadening participation 2:40pm - 4:00pm

- **Warm-up:** Snap! game
- **Learn:** DEAIIB strategies to broaden participation
- **Reflect and share:** DEAIIB strategies your ecosystem uses
- Short break

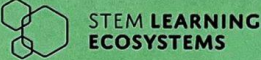
Part 3 - STEM engagement + Action plans

4:00pm-5:30pm

- **Warm-up:** What's in the box? game
- **Learn:** Elements of authentic STEM engagement and learning
- **Reflect and share:** Connecting learners and STEM
- **Discuss:** Choice of topics
- **Action plan:** 3 action items for your team + final thoughts
- **Wrap up:** Follow-up and additional resources
- **Adjourn**

Action plan

At the end of the day, you'll identify **three priorities**, identify **relationships and resources** to address them, and list **concrete next steps** you can take toward them.



ACTION PLAN

PRIORITIES <i>What are three priorities for our ecosystem that emerged from our work today?</i>	RELATIONSHIPS & RESOURCES <i>What do we need to address these priorities?</i>	ACTIONS <i>What next steps can we take to build momentum and make progress on these priorities?</i>
1. Relationships! invest in people + build trust	time: go slow to go fast	get creative about building partnerships - what do can our meetings / convenings look like now?

Materials

Your folder has printed copies of the worksheets we're using today, as well as some take-home materials.

All materials from today's session are available as digital files at:

<https://www.nisenet.org/SLECoP2023>



Introductions



STEM **LEARNING**
ECOSYSTEMS

SciAct STEM Ecosystems

Investigators
Researcher/evaluators

Rae Ostman Arizona State University

Paul Martin Arizona State University

Matt Cass Southwestern Community College

Elena Sparrow University of Alaska Fairbanks

Liz Kollmann Museum of Science, Boston

Allison Anderson Museum of Science, Boston

Ann Atwood Museum of Science, Boston

SciAct STEM Ecosystems

Ecosystem leaders
and practitioners

Matt Cass Smoky Mountain STEM Collaborative

Randi Neff Smoky Mountain STEM Collaborative

Elena Sparrow Arctic & Earth SIGNS

Christi Buffington Arctic & Earth SIGNS

Kal Mannis Rural Activation & Innovation Network

Leigh Peake Learning Ecosystems Northeast

Ali Jackson Learning Ecosystems Northeast

Molly Auclair Learning Ecosystems Northeast

Sarah VanDenbergh Learning Ecosystems NE

Who's here?

Let's find out who's in the room!

- For each question, stand up with any response that applies to you.
- Or, if you prefer, you can raise your hand.

Where are you from?

My ecosystem is located in:

- Western US (including Pacific and Arctic)
- Central or Midwestern US
- Southwestern US
- Northeastern US
- Southeastern US (including Caribbean)

What is your role?

- Ecosystem leader, backbone org
- Leader of a key ecosystem partner
- Educator, education specialist
- Program manager
- Community leader, nonprofit
- Researcher, evaluator
- Funder
- Another role

How long
have you
been
doing this?

I have been involved with my ecosystem for:

- 0-2 years
- 3-5 years
- 6+ years

What are your goals for today?

- Meet members of other ecosystems
- Learn about practices related to DEAIIB (Diversity, Equity, Accessibility, Inclusion, and Belonging)
- Learn strategies for leadership, partnerships, and engagement
- Learn about NASA's support of ecosystems
- Create an action plan
- Something else

Signal to regroup

Introduce yourself to the others at your table

Your **name**

Your ecosystem name or **location**

Something you're **proud of** about your work

PART 1: STEM Learning Ecosystems



STEM LEARNING
ECOSYSTEMS

What is a STEM learning ecosystem?

Let's have a few volunteers try to explain
in **ONE** sentence:

- What are some characteristics of STEM learning ecosystems?
- What distinguishes them from other kinds of partnerships?
- How do you communicate what you do for your community?

Our definition of a STEM learning ecosystem

STEM learning ecosystems unite people, communities, organizations, and resources to create STEM engagement and education experiences for all people throughout their lifetimes.

By developing mutually beneficial partnerships, leveraging complementary expertise and resources, implementing best practices, and creating pathways among learning opportunities, intentional STEM ecosystem structures can support individual learning and community growth.

Ecosystem study methods + findings

Allison Anderson

Liz Kollmann

Ann Atwood

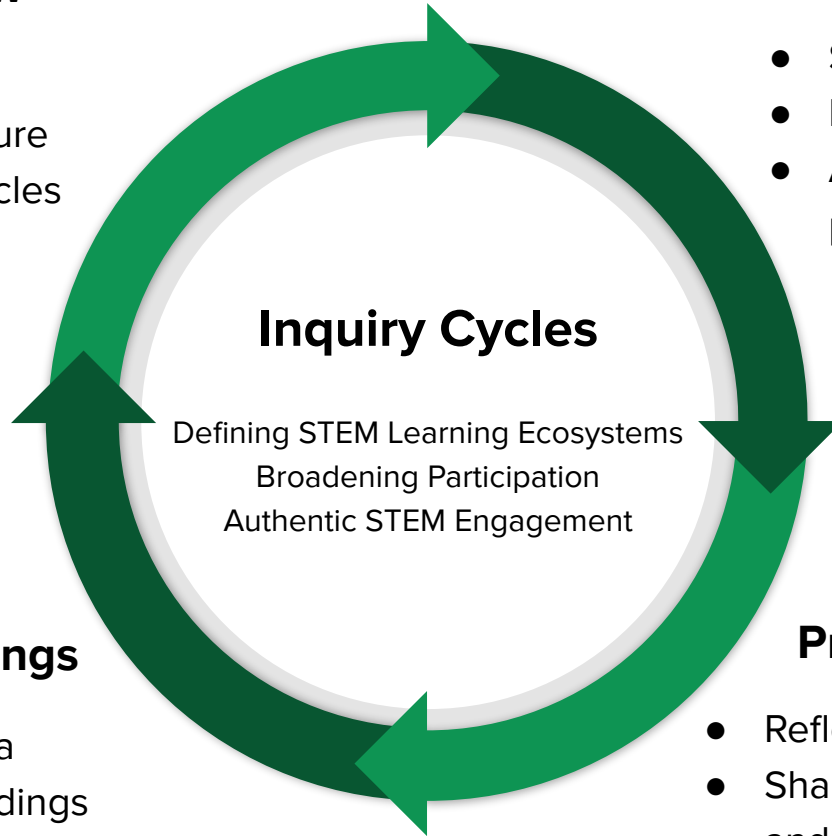
Museum of Science,
Boston

Literature Review

- Reading and synthesizing literature
- Discussing key articles with project team

Advisor Interviews

- Sharing findings to-date
- Discussing topic area
- Advice on questions for project teams



Project Team Interviews

- Reflect on findings to-date
- Sharing examples of practices and processes
- Addressing success or challenges

Analysis and Findings

- Analyze interview data
- Discuss and refine findings with project team

Project Team Interviews

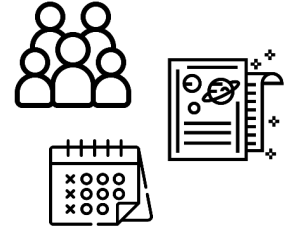
Group interviews included a variety of team members and partners from the four projects, such as:

- Project PIs and Co-Is
- Core project staff and partners
- Project evaluators
- Program/volunteer coordinators
- University professors and staff
- Museum staff
- Library staff
- K-12 teachers
- Community group staff (e.g. 4-H)



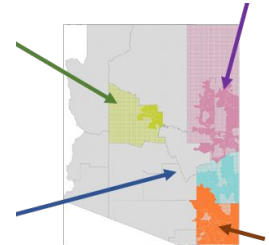
What are key characteristics for successful ecosystems?

Successful STEM learning ecosystems are built and sustained through **intentional** principles, practices, and activities.



Successful STEM learning ecosystems thrive through personal and organizational **relationships**

Successful STEM learning ecosystems are embedded in and reflect their geographic and cultural **context**.



Key finding 1:

*STEM learning ecosystems are **intentional** partnerships for lifelong learning and engagement, which are grounded in strong community **relationships** and **responsive** to their context.*

Arctic and Earth SIGNs

STEM Integrating
GLOBE and NASA

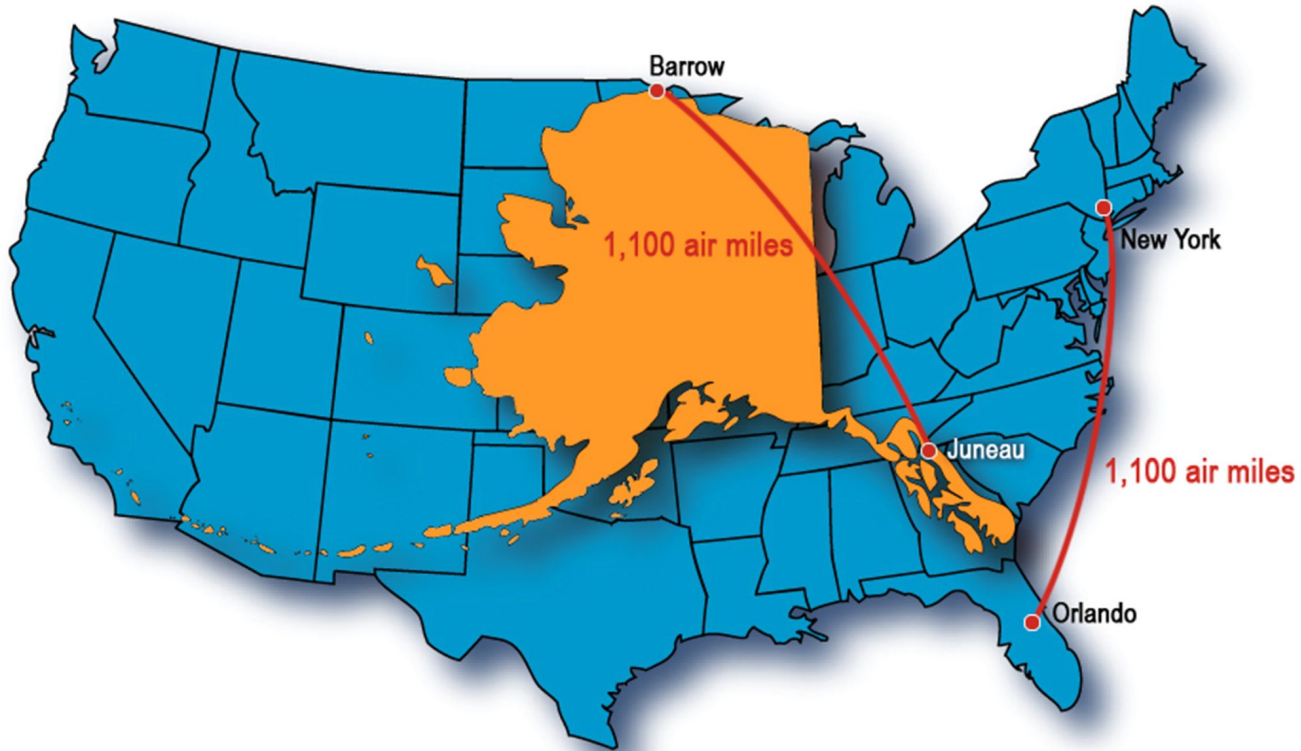


Elena Sparrow

Christi Buffington

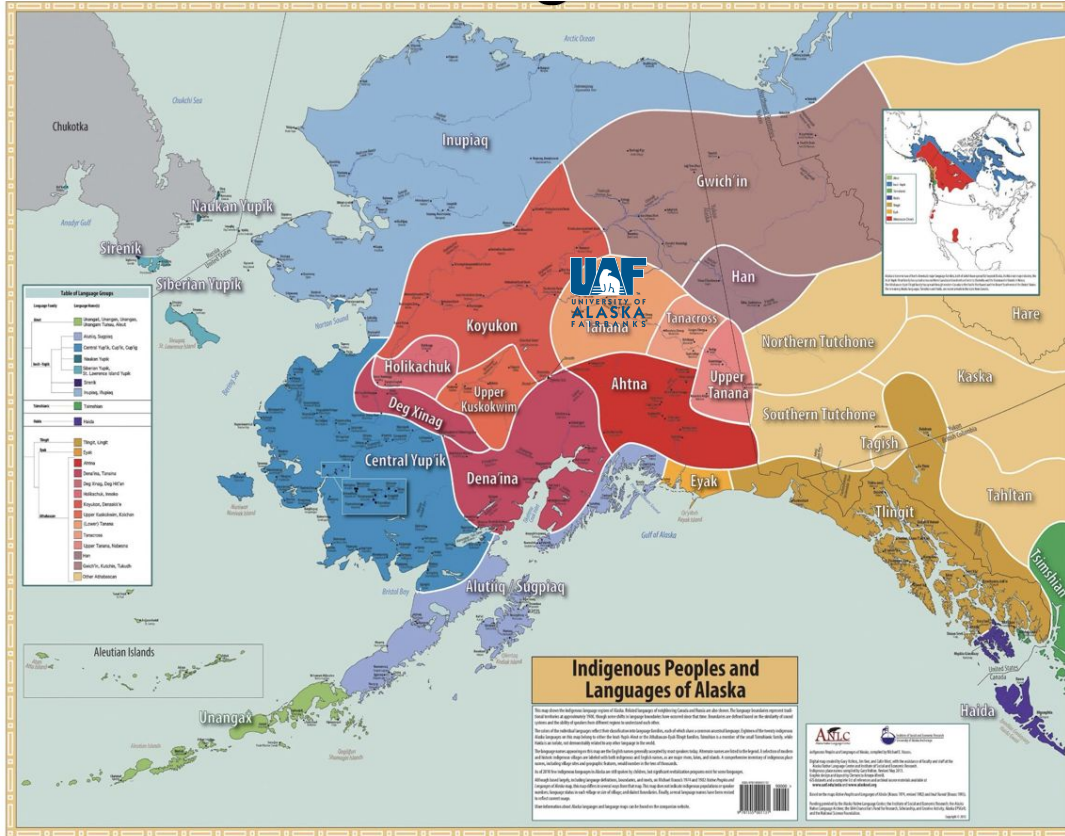
University of Alaska
Fairbanks



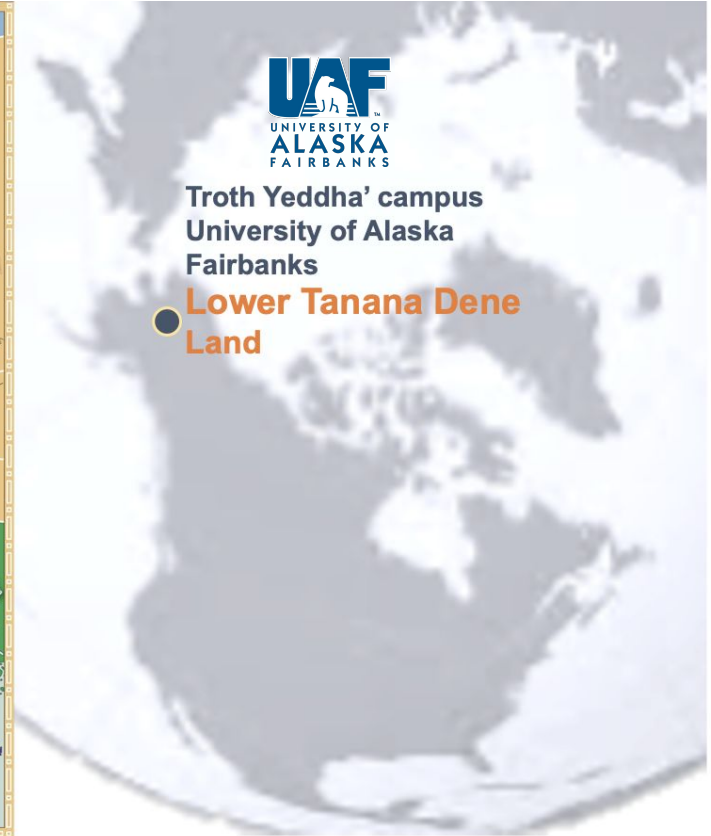


Map source: US Fish & Wildlife Service

Culturally Responsive STEM Learning



Credit: compiled by Michael E. Krauss (2013). Alaska Native Language Center





Arctic and Earth SIGNs Objectives

- Increase engagement of underrepresented youth and adults in STEM, particularly rural and indigenous educators and youth
- Increase capacity for communities to respond to climate change issues through youth, educator, and community member education



Learning Ecosystems Northeast

Molly Auclair

Sarah VanDenbergh

Leigh Peake

Gulf of Maine Research
Institute



Learning Ecosystems Northeast (LENE)



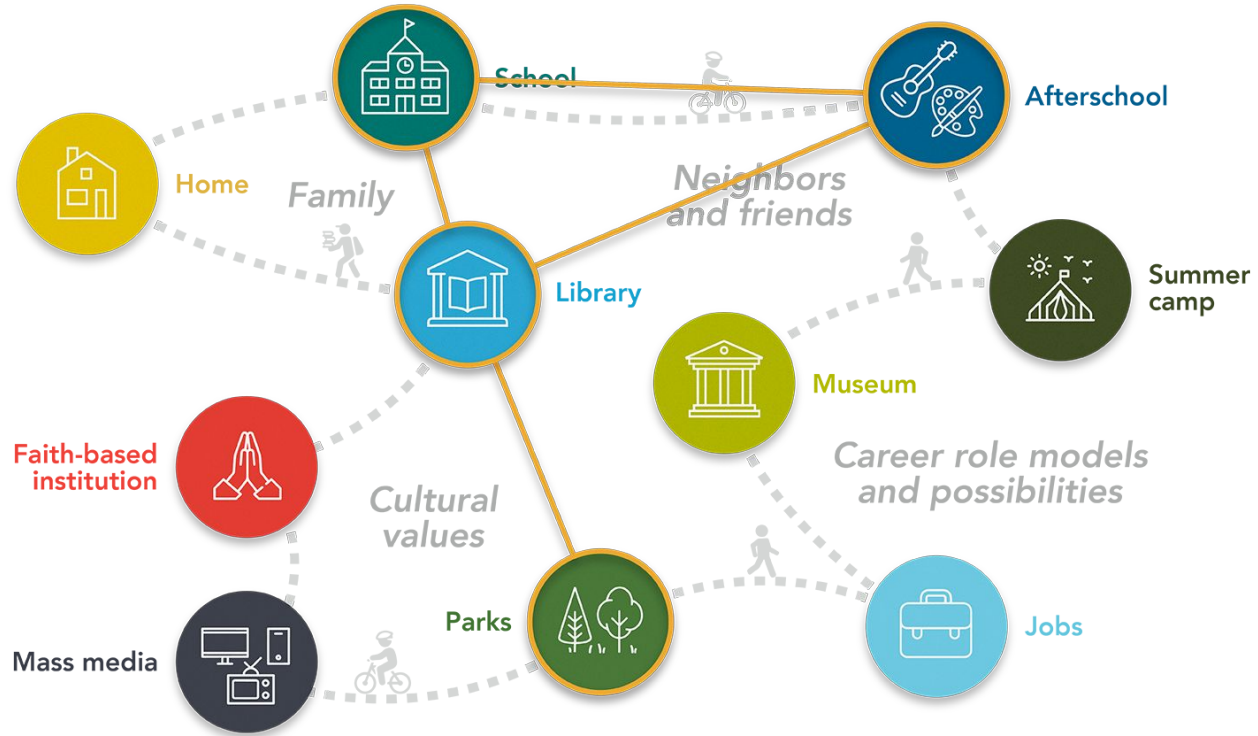


Learning Ecosystems Northeast

LENE is an network of education partners across the Northeast, connecting to build local learning communities committed to empowering the next generation of climate stewards by:

- Engaging communities
- Building climate and data literacy
- Fostering strong science interest, identity, and agency

Connected Learning



Learning Ecosystems Northeast (LENE)

Ways we are **intentional** in our work, focused on **relationships**, and **responsive** to the communities we work with:

- Relationships First
- Community Based Partnerships
- Supporting & Connecting Adults



Learning Ecosystems Northeast (LENE)

Ways we are **intentional** in our work, focused on **relationships**, and **responsive** to the communities we work with:

- Long Term Sustainability
- Co-Develop Goals and Vision
- Responsive to Local Needs



Rural Activation and Innovation Network

NSF DRL#1612555

2016-2023 => and beyond!

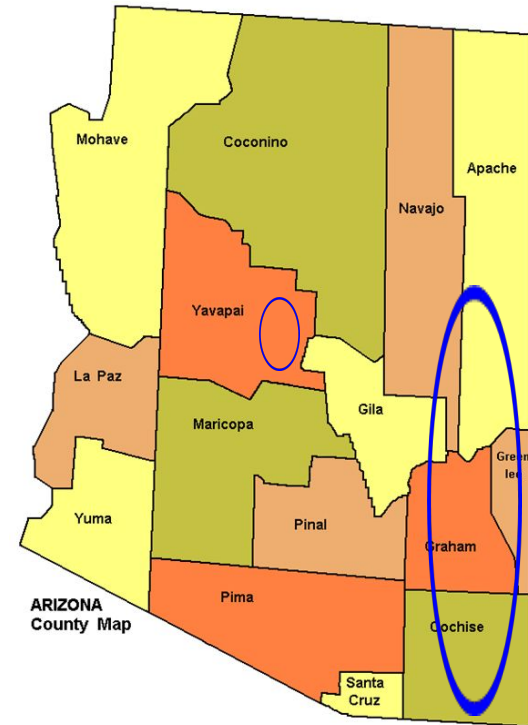
Kal Mannis

Arizona Science Center



RAIN Program Goals

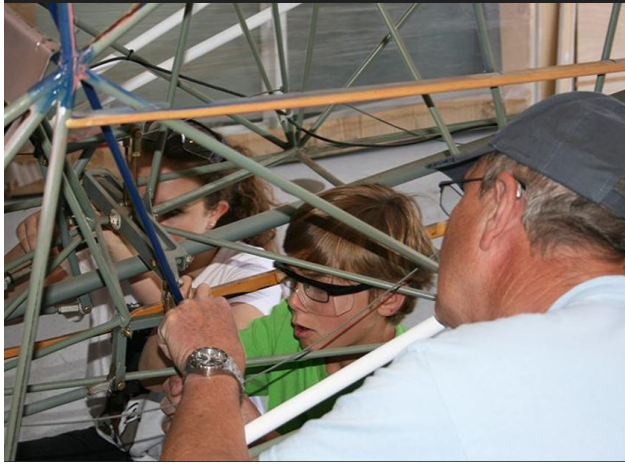
1. Encourage a change in local identity in relation to the value of STEM learning and its impact on the economy
2. Create a scope of work that engages community resources and expertise in engaging STEM activities
3. Build a research base on how to engage and empower rural communities to use STEM the basis of change
4. Creation of a statewide hub, for this grant – the Arizona Science Center. This hub will be used to leverage experts, resources, and best practices across the communities within the network. It is envisioned that this hub will provide sustainability over and beyond the grant.



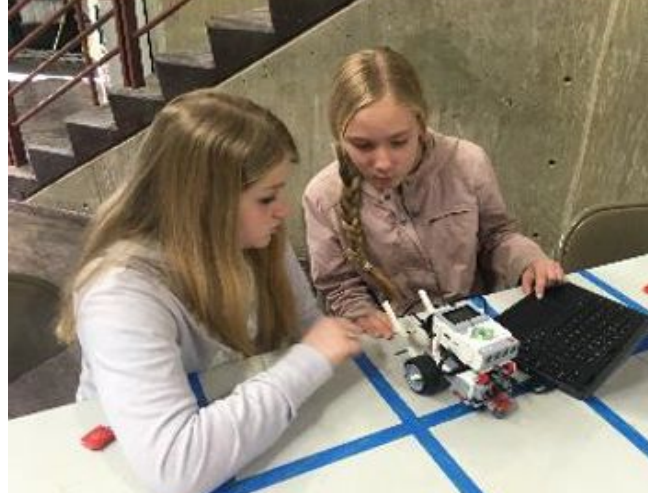
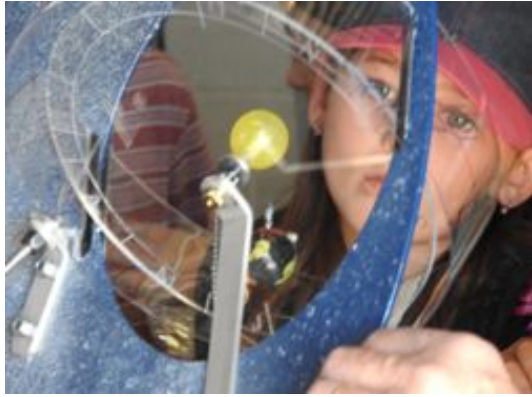
Rural Innovation Councils (RICS) - heart of RAIN

1. Each RIC will develop a series of **artifacts** to help envision their region and to plan their strategies. These include: regional asset map, strategic plan, budget plan, and media plan.
2. Each (RIC) will help to **develop and support the expansion of local informal science education** projects, experiences, events, competitions, etc.
3. RICs will create **professional development opportunities for community leaders and members** to stimulate dialogue, interest, and the engagement of their community members
4. **Supported events should highlight real world experiences/applications**, career opportunities, and impacts on local economies.
5. Once per year core members of the RICs will come together for an **annual conference**.

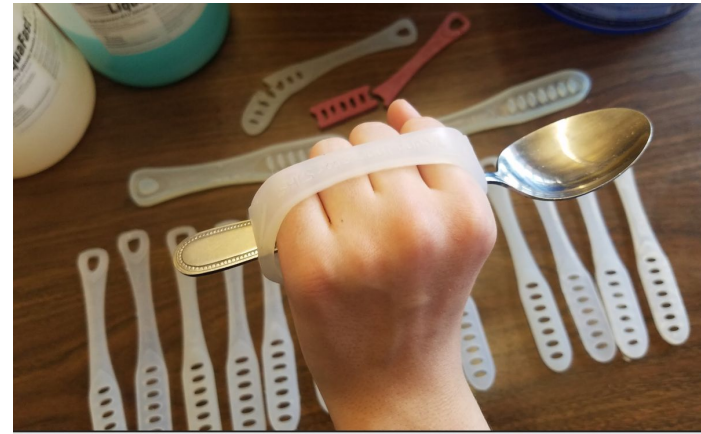
200+ Supported; 250+ convening;
75+ partner organizations; 25k square miles



Strengthening programming *“from”* and not *“for”*



Snowflake Junior High Young Innovators



Smoky Mountains STEM Collaborative

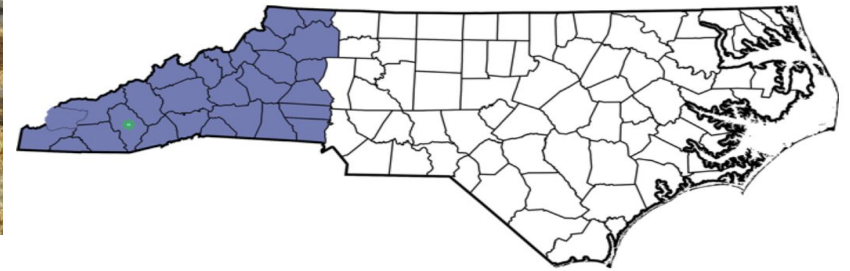
Matt Cass

Randi Neff

Southwestern Community
College (North Carolina)



SMSC



SMSC

Building upon the relationship that Southwestern CC had with the community after 50 years of service to the region, the SMSC was able to build off our successful 2017 eclipse events to open doors with new partners in the region and actively seek areas we could contribute and support existing STEM efforts.





Credit: Goddard SFC - all Earth to Sky Teams - Oct. 2022

As we've grown we have expanded from financial and material support to collaborating to create exciting, new ventures for learners in our region. Ranging from annual Space App events co-hosted at PARI to our newest regional project, to communicate local climate change impacts through our Earth to Sky team.

Similarly, we have become widely known as a reliable partner for improving regional access to STEM.

Draw your ecosystem

Grab two differently colored pens. Using the first color, label any components you choose. For example, with a tree:

VALUES - Add in some of your core values as the bedrock and soil.

PURPOSE- Choose up to 5 ideas that represent your vision for what your STEM ecosystem makes possible in your community. Label the leaf clusters.

LEARNERS - Sketch in some animals who live in the tree and label different learners and participants of your ecosystem.

RELATIONSHIPS - Indicate key partnerships and assets that currently make your learning ecosystem possible. Mark those on the roots and trunk.

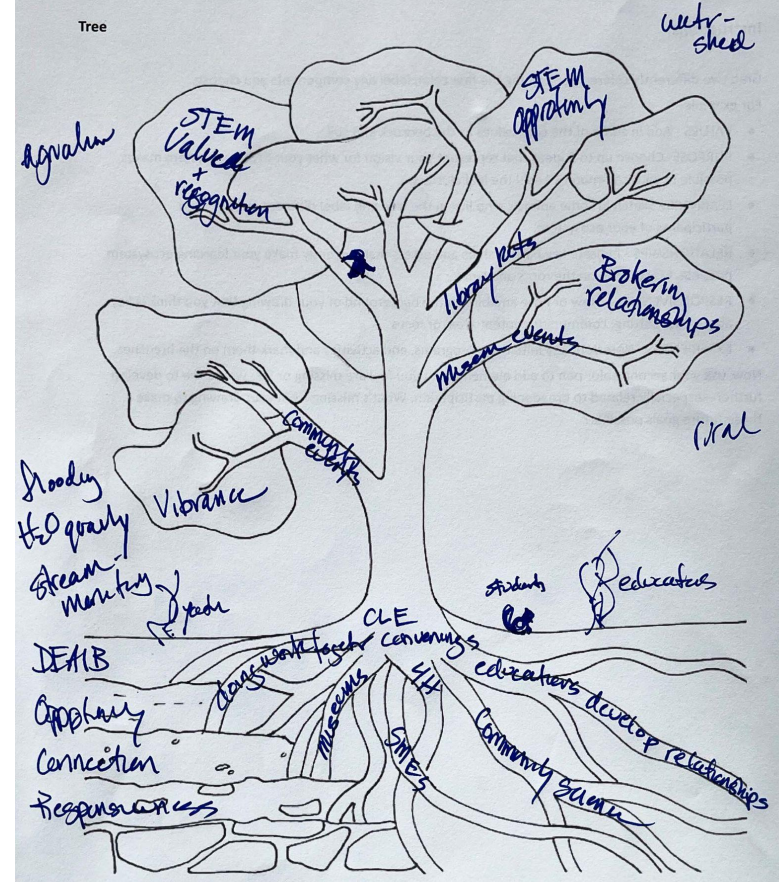
RESPONSIVENESS - Draw or note anything in the background of your drawing that you think is key about your setting, community, content area, or focus.

EXPERIENCES - Note your key initiatives, programs, and activities and mark them on the branches.

Now, use your second color pen to add elements that you feel are missing or you would like to develop further—especially related to broadening participation. What's missing from your drawing to make these future goals possible?

Draw a simple diagram of your STEM ecosystem

Tree



Tree example. You can also use the watershed – or draw your own idea!

This afternoon

- Using DEAIB practices to broaden participation
- Creating opportunities for authentic STEM learning
- Choice of discussion groups
- Action plan and follow-up



Break



STEM **LEARNING**
ECOSYSTEMS

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PART 2: Broadening participation



STEM LEARNING
ECOSYSTEMS

Meet new
people!

If you'd like, please get up and change tables.

Snap!

Let's stand up and play a game!

- **Find a partner** and stand facing each other.
- **Imagine you have a deck of cards.** Shuffle it and hold it in a pile.
- **To play, flip your top card** at the same time and say out loud what it is. Keep flipping until you both draw the same thing.
- **Say “Snap!” when you have a match.**
- **Count how many matches you have** in each round. We'll play three or four rounds.

The objective is to “Snap!” as many times as possible each round.

Reflect and share

- Was it easier to make a match in some rounds than others? Why do you think that was?
- What did you notice about the concepts of DEAIB from playing this game?



Our definitions of DEAIIB

Diversity: *The ways people are similar and different, including but not limited to identities, social positions, lived experiences, values, and beliefs.*

Equity: *Fair access to resources that advances social justice by allowing for full participation in society and self-determination in meeting fundamental needs. This requires addressing structural and historical barriers and systems of oppression.*

Accessibility: *Ensuring access to everyone along the continuum of human ability and experience.*

Inclusion: *An environment of involvement, respect, and connection in which the richness of diverse ideas, backgrounds, and perspectives is valued.*

Belonging: *An individual's feeling that they are connected to a given community, place, or situation, and that their whole self is valued, supported, and welcomed.*

Study findings: broadening participation

Allison Anderson

Liz Kollmann

Ann Atwood

Museum of Science,
Boston

The **organizational structures and culture** that a project team cultivates impacts their work with partners and public audiences.

Successful strategies include:

- Making space for time
- Be willing to learn and make changes
- Offering regular, flexible, and transparent communication, with multiple ways to obtain information

Healthy relationships are important for any partnership, but when centering DEAIIB it is important to build **genuine connections and support people** in feeling like they belong.

Successful strategies include:

- Fostering mutual respect and individual relationships with partners
- Engaging with audiences also as project partners
- Fostering reciprocal and mutually beneficial partnerships
- Valuing and incorporating different ways of knowing and diverse perspectives

Working openly and sharing access to people, organizations, information, programming, and other resources helps support ecosystems at an organizational level and in building mutually beneficial relationships.

Successful strategies include:

- Utilizing existing networks and resources
- Removing barriers for partners to engage with resources or audiences
- Working cooperatively, being transparent, and sharing with each other

Key finding 2:

*Ecosystems that are designed to broaden participation in STEM prioritize diversity, equity, accessibility, inclusion, and belonging (DEAIB) in their **structure, collaborations, and sharing of resources.***

Learning Ecosystems Northeast

Molly Auclair

Sarah VanDenbergh

Leigh Peake

Gulf of Maine Research
Institute



LENE core principles

- Center educators
- Amplify voices
- Connect learning contexts
- Be transparent



Structure

- Working in the Open
- Educator Compensation & Grants
- Ecosystem Design Flexibility and Innovation Opportunities
- Connected Educators to Foster Community Knowledge
- Sustainability through Local Leadership



Collaborations

Relationship focused

- Community Based Partnerships
 - Indigenous
 - Immigrant & Refugee
 - Rural
- Decision Making
- Varied and Repetitive Communication



Sharing of Resources

- Public
- Adaptable
- Feedback Driven
- Intentional Collaboration

Sea Level Rise and Coastal Flooding

As the Earth warms, sea level rise is increasingly threatening coastal ecosystems and communities

Last updated: 11/16/2022

Main Takeaways

- As oceans warm due to climate change, the water expands, leading to problems with sea level rise and coastal flooding. In addition, melting of land-based ice from mountain glaciers and polar ice sheets is contributing to rising sea levels.
- As sea levels rise, salt water increasingly infiltrates groundwater, which can have negative effects for people, animals, and plants and can make the land less able to absorb excess water, contributing to further problems with flooding.
- In Maine, the sea level may rise between 0.9 and 7.3 feet by the year 2100. With just 1.5 ft of sea level rise, some neighborhoods in Portland would experience minor flooding at high tides more than 100 days per year.
- Coastal habitats, such as salt marshes, can help buffer ecosystems/communities from the effects of sea level rise and coastal flooding.
- Creative infrastructure approaches can help us adapt to rising seas and coastal flooding. These include green infrastructure that absorbs water, "living" reefs, or more expansive engineering feats like those that the low-lying coastal nation of the Netherlands have long used to keep the sea at bay.

Overview

As the Earth warms due to climate change, the oceans that cover 70% of the globe are also warming. As seawater warms, it expands, contributing to rising sea levels and problems with flooding and erosion in coastal areas, especially during extreme high tides and coastal storm surges. In the Northeastern United States, the Gulf of Maine is one of the fastest warming bodies of water on the planet (see the [Gulf of Maine Warming Climate Story](#)). In addition, climate change is increasingly causing the melt of land-based ice from mountain glaciers and the polar ice sheets, also contributing to rising sea levels.

Impacts

As sea levels rise, coastal ecosystems and communities will increasingly be threatened by flooding. Additional human impacts, such as building development, threaten coastal ecosystems such as salt marshes that can provide buffers against coastal flooding and other climate change impacts, such as increased extreme precipitation events (see the [Extreme Precipitation Climate Story](#)).

Rural Activation and Innovation Network

Kal Mannis

Arizona Science Center



RAIN

The core RAIN proposal was written in 2011 prior to the current specialized definitions of STEM Learning Ecosystems and DEAIB. Yet both are at the heart of the project. DEAIB was embedded in the strategic planning and goal setting process as an outgrowth of asset and gap analysis annually undertaken on by each of the RICS.

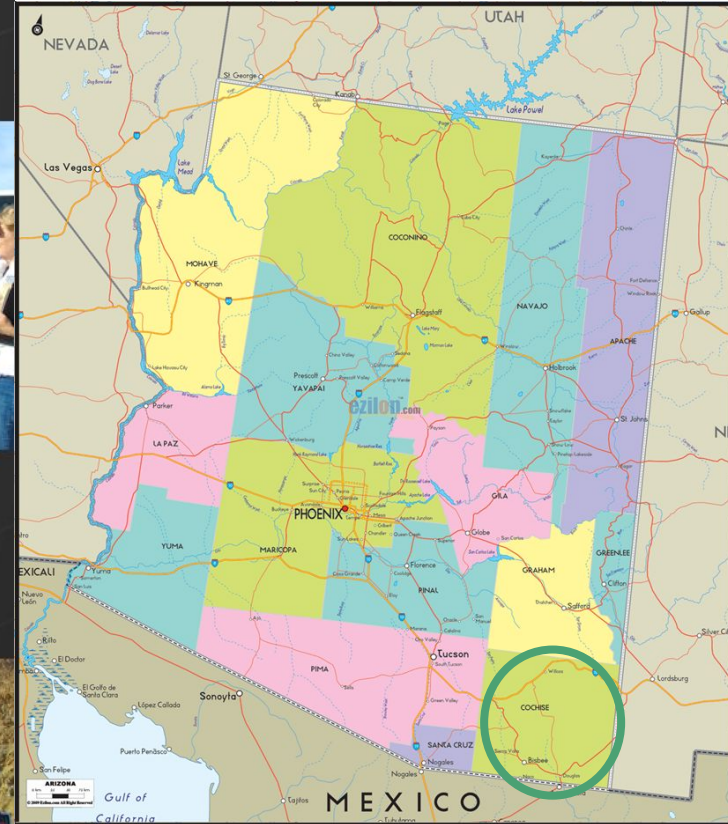
RICS themselves were created on a model developed by the Arizona Early Childhood Health and Education Board (Arizona First Things First). Which seats and funds 28 local councils to make place-based decisions that support EC. As with the FTF councils, the RICs were initially created with representatives from marginally overlapping sectors. Over the years this fluctuated as the RICs identified sectors they wanted included.



Cochise County

Population: 120,000 Size: 6500 square miles

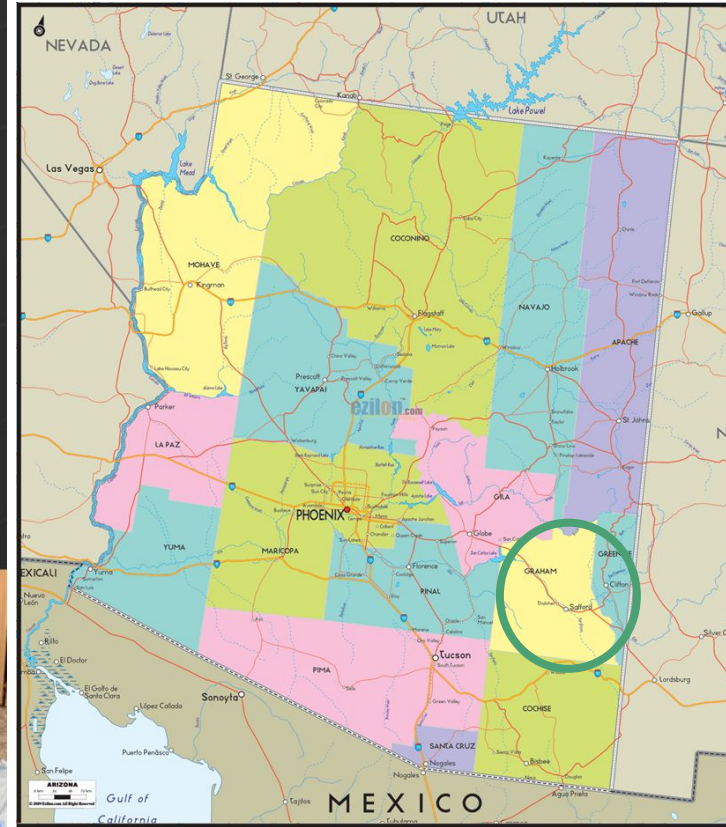
1. Bisbee Science and Research Center
2. Goar Ranch
3. Chief Science Officers
4. Studio 128 Willcox
5. Naco Wellness Center (AZ/Mexico)
6. Mitigation at Extraction Sites
7. Water Issues
8. Agriculture & changes – rise of the Vine Culture
9. Transborder studies
10. Loss of youth and Aging populations
11. Natural Resources



Graham & Greenlee Counties

Population: 46,000 Size: 6500 square miles

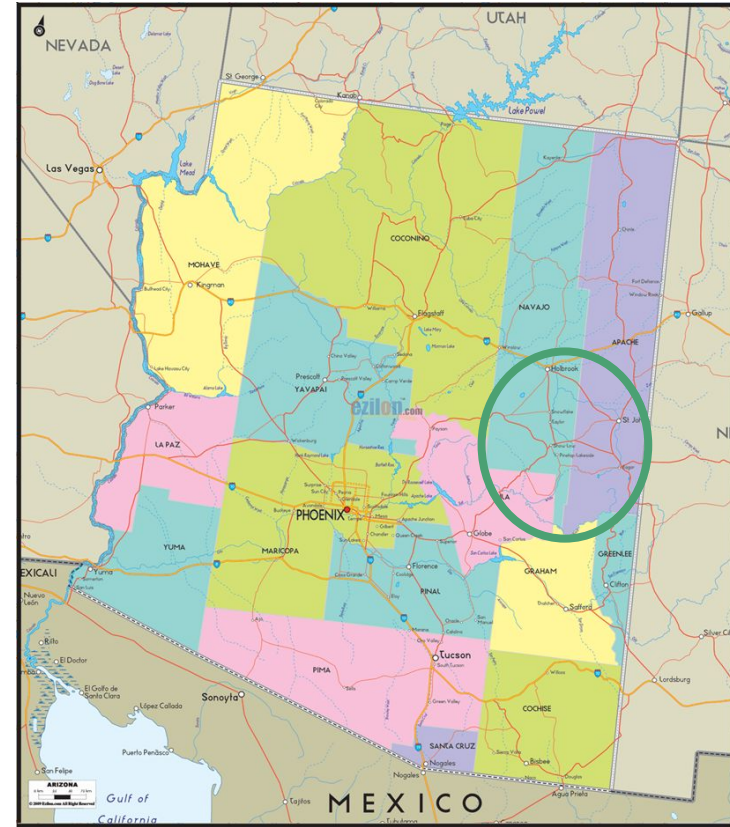
1. Mt Graham Observatory Complex
2. Extraction Industries
3. Isolated Populations
4. Tribal/Non-Tribal interface
5. Natural Resources – Gila River, Lakes, Watershed
6. Water Issues
7. Agriculture & Changes – Ranching and Cotton
8. Supports of Volunteerism
9. Development of Libraries as Informal Learning Center



Southern Navajo & Apache Counties

Population: 100,000 Size: 10,000 square miles

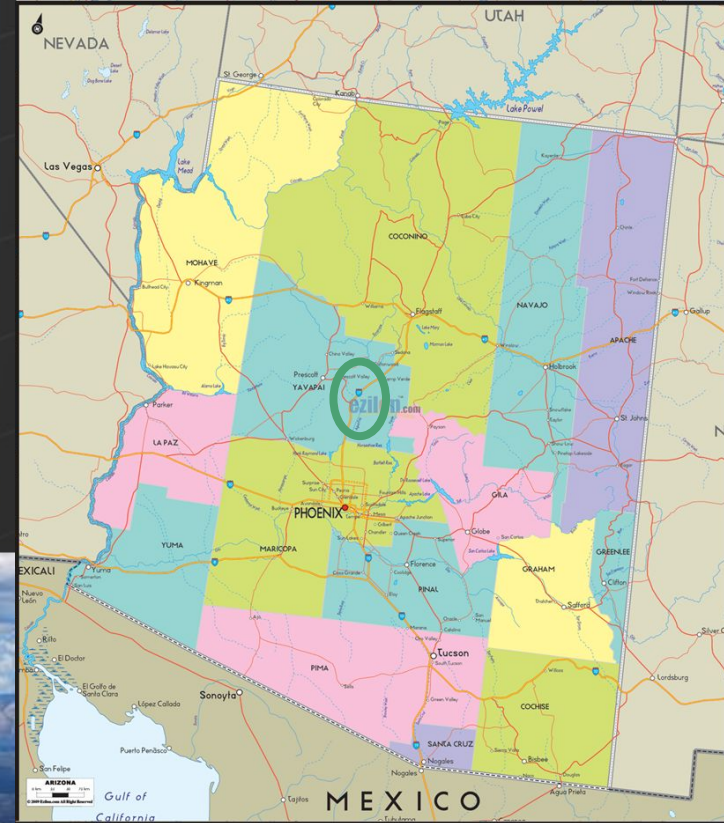
1. Impact of Volunteer Organizations
2. Loss of keystone industries
3. White Mountain Nature Center and Wildlife Rehab
4. Impact of Formal and Informal Networks
5. Tribal/Non-Tribal
6. Tourism
7. Water & Fire Issues
8. Agriculture & changes – Impact of Marijuana growing
9. Loss of youth and Aging populations
10. Natural Resources & Management
11. Transition of Libraries
12. Rise of Innovation Centers – Fabrication Labs, Workforce Training, Mechtronics



Verde Valley of Yavapai County

Population: 56,000 Size: 715 square miles

1. Innovative Elected Officials
2. Innovations in Town Resource management
3. Role of Environmental NGOs
4. Agriculture & Changes – Vine Culture, small farms
5. Unique Tribal/Non-Tribal interface
6. Tribal Cultural Preservation programs
7. Natural Resources – Verde River, Watershed, Forests
8. Extraction Industry Mitigation
9. Tourism
10. Aging population and loss of youth
11. Libraries as Informal Learning Centers



Strategies for DEAIAB

Share DEIAB strategies you use in your ecosystem related to:

- **Structure** (including systems, communication, culture)
- **Collaborations** (including roles, relationships, ways of working)
- **Resources** (including people, knowledge, in-kind, funding)
- **Other** strategies

Review ideas from others for inspiration!

Reflect and note

Take a few minutes to reflect and note:

- Strategies and ideas you can benefit from
- Questions you still have
- Things you want to add to your ecosystem drawing



DEAIB STRATEGIES

Review the ideas the group has shared. Take a few minutes to jot down any **APPROACHES** that stood out to you and **QUESTIONS** you still have.

APPROACHES

What strategies or approaches have others used that could work for our ecosystem?

Having "community connector" as an official role - to help us understand local context better + build relationships.

Example

Break



STEM **LEARNING**
ECOSYSTEMS

PART 3: Authentic STEM engagement



STEM LEARNING
ECOSYSTEMS

Meet new
people!

If you'd like, please get up and change tables.

What's in the box?

Let's stand up and play a game!

- **Find a partner** and stand facing each other. Decide who will be the gift giver and the receiver.
- **The gift giver presents an imaginary box** to their partner, saying “This is for you.” Use your body language to suggest if the “gift” is big or small, heavy or light.
- **The recipient accepts the box**, pretends to open it, and announces what is inside. You can make up anything!
- **The gift giver explains why they chose the gift.** Say something that fits with the gift the recipient has imagined.
- **The recipient says “Thank you”** and says why they will enjoy the gift.
- **The giver says “You're welcome”** to conclude the round.
- **Switch roles** and play again.

The objective is to listen to each other and respond appropriately and creatively.

Reflect and share

- Were you surprised by anything your partner said? How did you figure out how to respond?
- What techniques did you use to come up with your reasons for appreciating and giving the gifts?
- How could you apply what you learned in this activity?



Study findings: authentic STEM learning

Allison Anderson

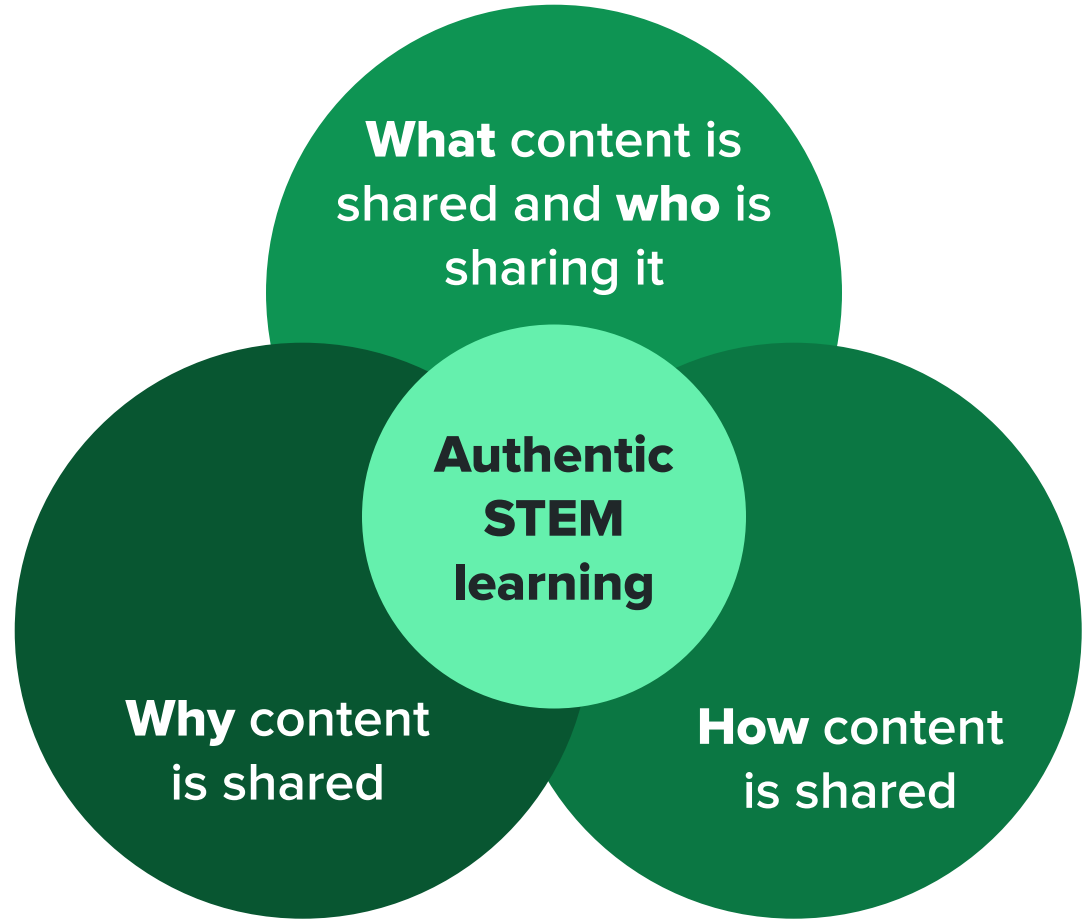
Liz Kollmann

Ann Atwood

Museum of Science,
Boston

Methods

Investigating authentic STEM engagement by approaching the topic from different, but interconnected, perspectives.



Investigating authentic STEM engagement by approaching the topic from different, but interconnected, perspectives.

What content is shared
(and **Who** is sharing it)

Why the content is shared

How the content is shared

- Using scientific data and assets, from an organization like NASA or generated by participants.
- Connects with subject matter experts, such as NASA-defined experts or project/community defined experts.

Investigating authentic STEM engagement by approaching the topic from different, but interconnected, perspectives.

What content is shared
(and **Who** is sharing it)

Why the content is shared

How the content is shared

- Content and/or experiences are relevant to the learner, through their identities, communities, and/or culture.
- Promoting a sense of belonging and fostering inclusion.

Investigating authentic STEM engagement by approaching the topic from different, but interconnected, perspectives.

What content is shared
(and **Who** is sharing it)

Why the content is shared

How the content is shared

- Recognizing what people already bring to the table and constructing learning experiences that build on it
- Offering hands-on or active learning that fully engage the learner

Providing authentic STEM engagement **starts** with understanding what is **relevant** to the learner and their community, **then** connecting content, data, and experts to those topics.

Create relevant experiences by:

- Learning from partners and being present in communities
- Selecting content or data with a focus on being place-based and/or responsive to local interests
- Changing and adapting over time
- Respecting the capacity of partners to contribute

Key finding 3:

*Authentic STEM engagement values participant **identities**, provides **learner-centered** experiences, and features **relevant content**.*

Arctic and Earth SIGNs

Elena Sparrow

Christi Buffington

University of Alaska
Fairbanks



Designing for generational and cultural diversity: A culturally sustaining learning framework

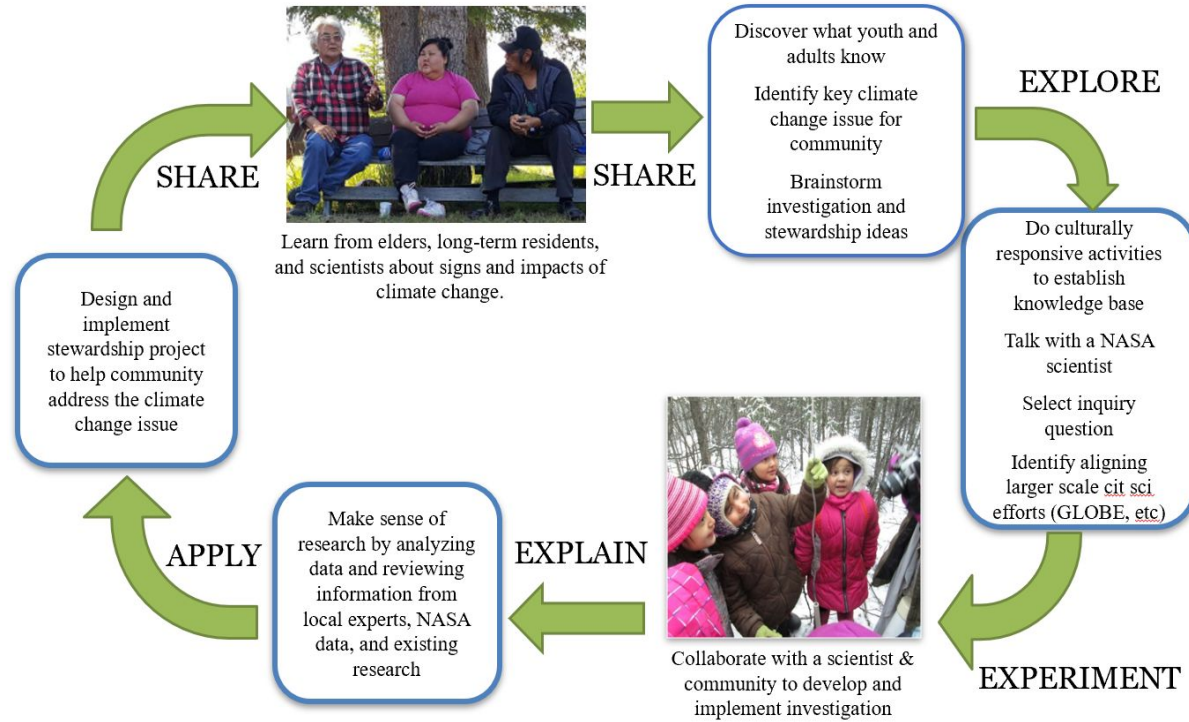


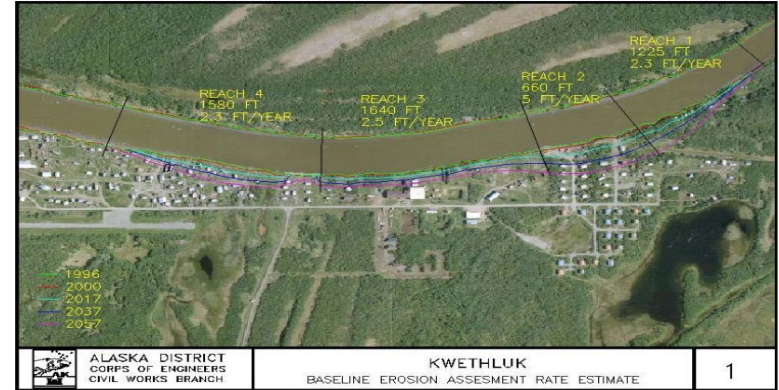
Figure modified from Stephens 2003 and OLCG 2002; published in Spellman et al. 2018

Locally relevant - Kwethluk example



Team: Ket'acik & Aapalluk Memorial School students, teacher Whitney Spiehler, Yupik Elder and teacher Pauline Morris.

Local Investigation: What is the rate of erosion occurring and what soil and disturbance factors influence the rate?



Community concern: Thawing permafrost and changing hydrology is causing people to lose their homes into the river.

Project match: GLOBE soils and UCAR National Water Model (INCLUDES)

Learner identities - Kwethluk example

Can we share who we are?



The Kwethluk team after performing their Yupik dance at the Globe Learning Expedition in Ireland. The team wore traditional garments made by their Elders. From left to right: teacher and Native Elder Pauline Morris, Jessie Nicholas, science teacher Whitney Spiehler, Elena Sparrow, Amber Alexie, Janna Pavilla, and Tristan Chimegalrea.

Smoky Mountains STEM Collaborative

Matt Cass

Randi Neff

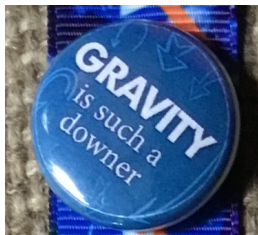
Southwestern Community
College (North Carolina)



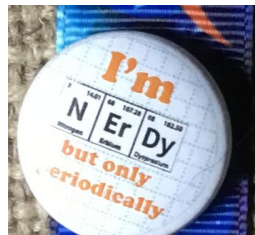
SMSC

Our first summer camp was held on our campus by our staff. After evaluating the camp, we reached out to local teachers and partnered with a group from Smokey Mountain Elementary School.

The teachers quickly transformed the camp into a joyous experience for both them and their students with trips to local sites which many students could not access otherwise.

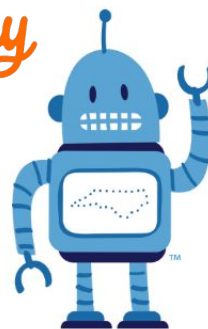


Buttons earned at summer camp



Since 2021, this partnership has expanded the idea of earning buttons to issuing digital badges for students who take leadership roles for events such as a school science festival and learn valuable work skills.

Credly



Smokey Mountain Elementary is excited to announce our **Duke Energy Science Festival** on April 20th! The activities will begin at 8:20 for students in grades 3 through 8.

Children will explore science, technology, engineering and mathematics through engaging hands-on activities such as making paper circuit robots, testing the power of air, building catapults, and much more!

Duke Energy Science Nights and Days are an initiative of the North Carolina Science Festival. The North Carolina Science Festival is a month-long celebration of science that occurs every April. Visit www.ncsciencefestival.org to see a complete calendar of events.

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Authentic STEM learning

Using the **AUTHENTIC STEM LEARNING** worksheet:

- Choose one group of learners that will help your ecosystem broaden participation. This could be a group you want to establish or deepen a relationship with.
- The left hand column summarizes the findings we just shared, describing the elements we associate with authentic STEM learning.
- In the right hand column, consider how you can learn more about this group, find out how to make STEM relevant to them, and design active learning experiences.
- On the back side of the page, you can add more detail and/or note questions and next steps to further develop your ideas.

Discuss with others at your table. What important questions or promising approaches have you identified?



ELEMENTS

CREATING OPPORTUNITIES FOR AUTHENTIC STEM LEARNING

<p>Learners:</p> <ul style="list-style-type: none">• Personal identity• Community• Place	<p><i>Who do we want to engage? What do we know about this group? What relationships do we have with them?</i></p> <p>elementary-aged youth families educators (formal + informal) + librarians community knowledge holders (Indigenous and western) SMEs - industry, research, etc...</p>
<p>STEM content:</p> <ul style="list-style-type: none">• Relevant• Accurate• Trustworthy	<p><i>What interest does this group have in our focus area of STEM? In what ways is learning about it relevant or valuable to them?</i></p> <p>Earth science NASA research data-literacy</p>
<p>Experiences:</p> <ul style="list-style-type: none">• Engaging• Active• Social/interactive	<p><i>What kinds of learning experiences does this group prefer? Where and when can they participate?</i></p> <p>Kits school programs field-trips 4H camps + programs events</p> <p>community gatherings farmers markets site visits library programs</p>

Example

Discussion groups

STRUCTURE, RELATIONSHIPS, RESOURCES

Developing and changing your organizational structure (Kal)

Developing relationships with partners (Sarah & Molly)

Aligning goals and evaluating progress (Liz & Ann)

DEAIB & AUTHENTIC STEM LEARNING

Creating opportunities for STEM engagement (Randi & Matt)

Centering DEAIB in your ecosystem (Ali)

Working with Indigenous groups (Elena & Christi)

PART 4: Action plans



Reflections

Share one thing that you appreciated about today or that you are excited to implement when you get home.

Follow-up

Connecting later in the week - Tuesday, 5pm Happy Hour with exhibitors

Online check-in June 2, 12pm-1pm Eastern - we will email information

Action plan

Reflect on the day and review all your notes.

Then, using the colored ACTION PLAN worksheet:

- Note down three ideas or priorities for your ecosystem that you want to follow up on.
- For each one, note any ideas you have about how you might approach it.
- Then identify at least one concrete thing you will do to follow up on that priority.

Optional: You can also refer to the Reflection Questions (a take-home resource).

ACTION PLAN

PRIORITIES <i>What are three priorities for our ecosystem that emerged from our work today?</i>	RELATIONSHIPS & RESOURCES <i>What do we need to address these priorities?</i>	ACTIONS <i>What next steps can we take to build momentum and make progress on these priorities?</i>
1. Relationships! Invest in people + build trust	time: go slow to go fast	get creative about building partnerships - what do can our meetings / convenings look like now?
2.		
3.		

Example

Resources

Materials we used today are available at <https://www.nisenet.org/SLECoP2023>

There is also a list of more useful resources in your packet



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Thank you!



Partner

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