NISE Network Online Workshop

Introduction to STEM Learning Ecosystems - Principles and Practices for Community-wide Partnerships

February 11, 2025

Today's Presenters:

- **Rae Ostman,** Arizona State University, Tempe, AZ
- **Ali Jackson,** Sciencenter, Ithaca, NY
- **Allison Anderson,** Museum of Science, Boston, MA

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. A selection of questions from the chat and workshop registration will be read aloud by moderators for presenters to answer during the Q&A.

Today's workshop will be recorded; those registered will receive an email when available here: nisenet.org/online-workshop-recordings

How to turn on Live Closed Captions

Once the host enables captions, participants will need to turn them on:

1. In the meeting **toolbar**, select **Show Captions**
   (if you don't see this option on your toolbar, select **More…** and then **Captions**)
2. Confirm or choose the language in which the captions will appear and select **Save**
3. The subtitles will appear at the bottom of the Zoom window and can also be dragged to other parts of the window
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See You Next Time!

Upcoming Online Workshops...

Museum Experiences Participating in STEM Learning Ecosystems

Tuesday, March 4, 2025
2pm-3pm Eastern / 11am-12pm Pacific

- Jenny Frank, STEM Learning Ecosystems Community of Practice (SLECoP) at TIES
- Beth Demke, North Dakota's Gateway to Science, Bismarck, ND
- Peter Leipzig & Emily Belle, Sciencenter, Ithaca, NY
- Renee Henry, Terre Haute Children's Museum, Terre Haute, IL

Creating Relevant & Meaningful STEM Experiences

Tuesday, April 2025 - TBA
2pm-3pm Eastern / 11am-12pm Pacific

NISE NETWORK
ONLINE WORKSHOPS

Learn more and register at nisenet.org/events

Introduction

STEM Learning Ecosystems project

- **Collaboration** of several teams in NASA's Science Activation (SciAct) program
- **Inquiry** to learn about principles and practices of intentional partnerships designed to broaden participation in STEM
- **Key ideas** about reciprocal partnerships, organization of STEM ecosystems, and authentic STEM learning

STEM LEARNING ECOSYSTEMS

NISE NATIONAL INFORMAL STEM EDUCATION NETWORK

RAIN rural activation and innovation network

ARCTIC & EARTH STEM INTEGRATING GLOBE & NASA

Smoky Mountains STEM COLLABORATIVE

Learning Ecosystems Northeast

INVESTIGATORS

Rae Ostman Arizona State University (PI)

Paul Martin Arizona State University (co-I)

Matt Cass Southwestern Community College (co-I)

Elena Sparrow University of Alaska Fairbanks (co-I)

EVALUATORS

Liz Kollmann Museum of Science (evaluator)

Allison Anderson Museum of Science (evaluator)

Ann Atwood Museum of Science (evaluator)

ECOSYSTEMS

Arctic and Earth SIGNs

Learning Ecosystems Northeast

Rural Activation and Innovation Network

Smoky Mountain STEM Collaborative

Overview

- Introduce learning ecosystems as a way for communities to support STEM learning and engagement
- Review key ideas related to learning ecosystems: *community*, *belonging*, and *engagement*
- Reflect on connections to our own work and experiences
- Share resources to learn more

Evaluation overview

We are collecting evaluation data during this workshop. The purpose of collecting these data is to understand how participating in the workshop may contribute to your work.

Data will be collected from

- Two poll questions at the beginning
- One chat activity at the end

We are not collecting data during other parts of the workshop (e.g. ongoing chat or the Q&A.)

Your participation the evaluation is **voluntary** and **confidential**, meaning that you may choose to not participate and the data collected will be analyzed and reported **anonymously**.

If you have questions about participation, direct message Allison Anderson or Ann Atwood in the chat.

Evaluation questions

Getting to know you! Please use the poll to respond:

1. How do you identify as a professional within the project that you are representing today? Please select all that apply.

1. Which statement best describes your familiarity and involvement with STEM learning ecosystems?

STEM Learning Ecosystems

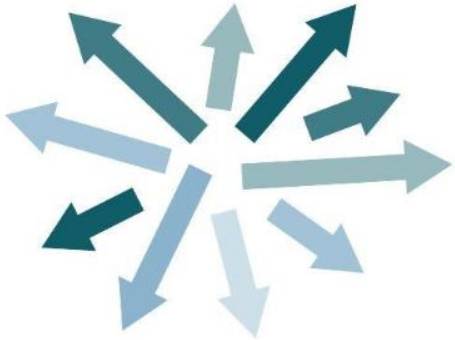
STEM Learning Ecosystems

STEM Learning Pathways

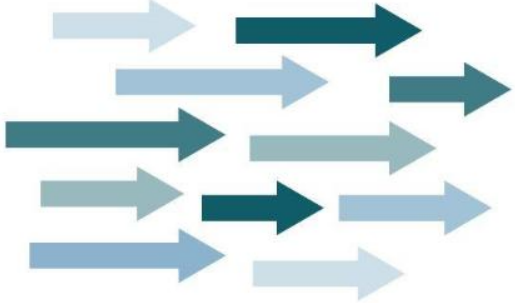
Different journeys for learning across a lifetime

Collective Impact

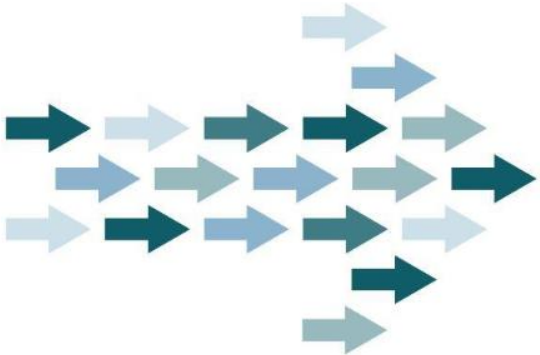
Organizations align efforts to achieve shared goals



Independent Impacts



Coordinated Impacts



Collective Impacts

STEM Learning Ecosystems

KEY IDEAS

Community

STEM learning ecosystems are built and sustained through intentional practices; thrive through reciprocal relationships; and are grounded in their geographic and cultural context.

Belonging

Ecosystems can broaden participation by cultivating genuine relationships among individuals and organizations; creating a flexible and transparent culture; sharing programming and resources; and prioritizing a sense of belonging.

Engagement

Authentic STEM engagement starts with understanding what is relevant to learners and communities, then creates connections to content through active learning experiences.

Key Idea: Community

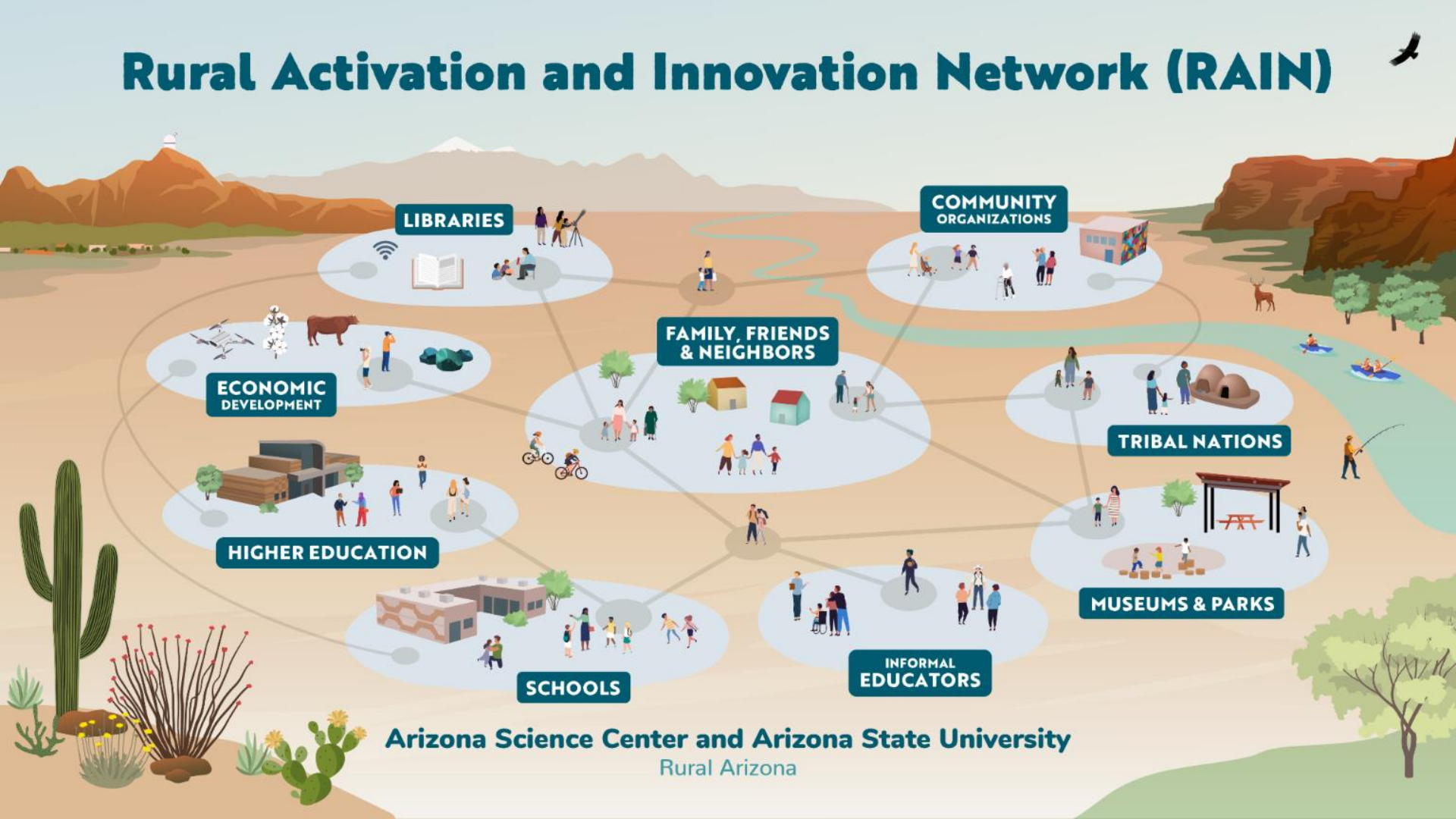
STEM Learning Ecosystems

KEY IDEAS

Community

STEM learning ecosystems are built and sustained through intentional practices; thrive through reciprocal relationships; and are grounded in their geographic and cultural context.

Rural Activation and Innovation Network (RAIN)



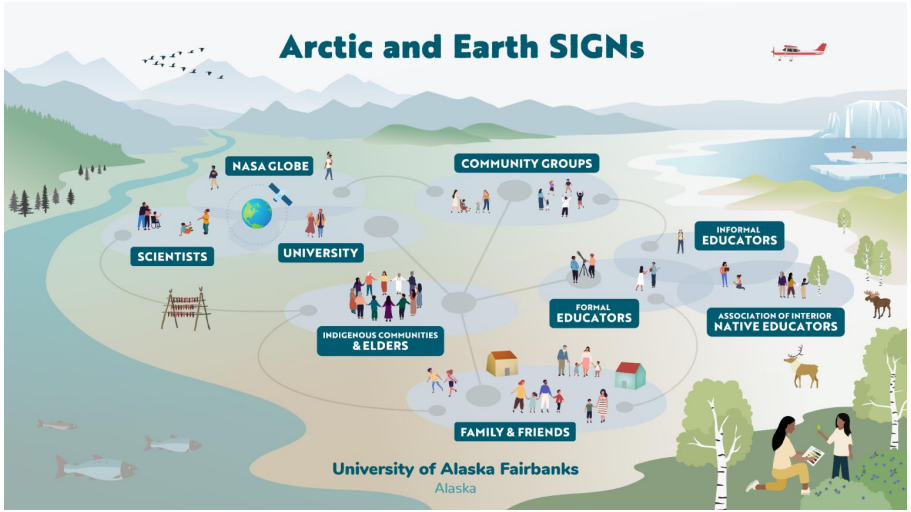
Arizona Science Center and Arizona State University

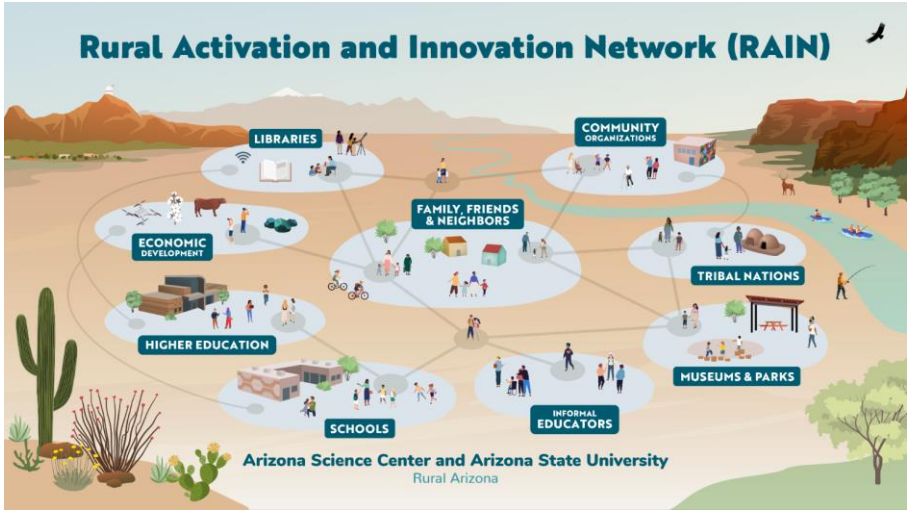
Rural Arizona

Community example

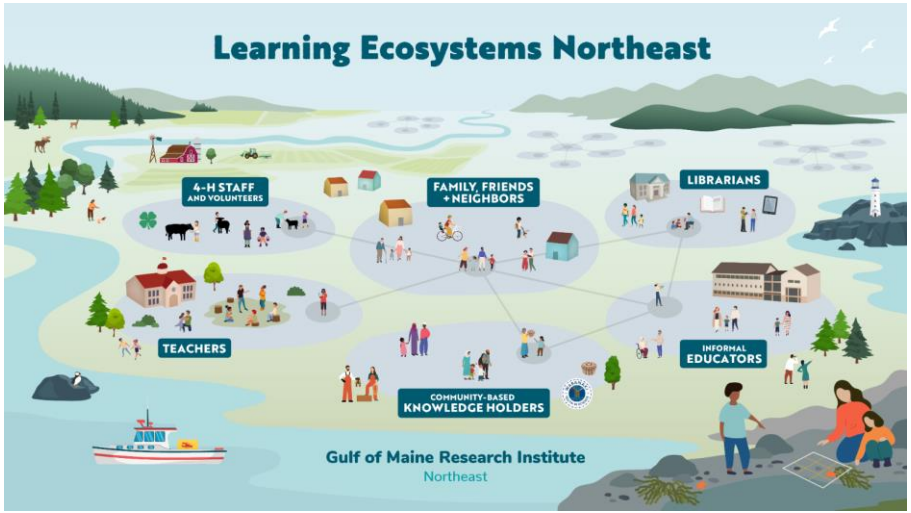
Rural Activation and Innovation Network

- Offer place-based learning in rural areas of Arizona
- Organized into regions to leverage community assets and relationships and respond to community priorities


Arctic and Earth SIGNs
NASA GLOBE
COMMUNITY GROUPS
SCIENTISTS
UNIVERSITY
INFORMAL EDUCATORS
FORMAL EDUCATORS
ASSOCIATION OF INTERIOR NATIVE EDUCATORS
INDIGENOUS COMMUNITIES & ELDERS
FAMILY & FRIENDS
University of Alaska Fairbanks
Alaska

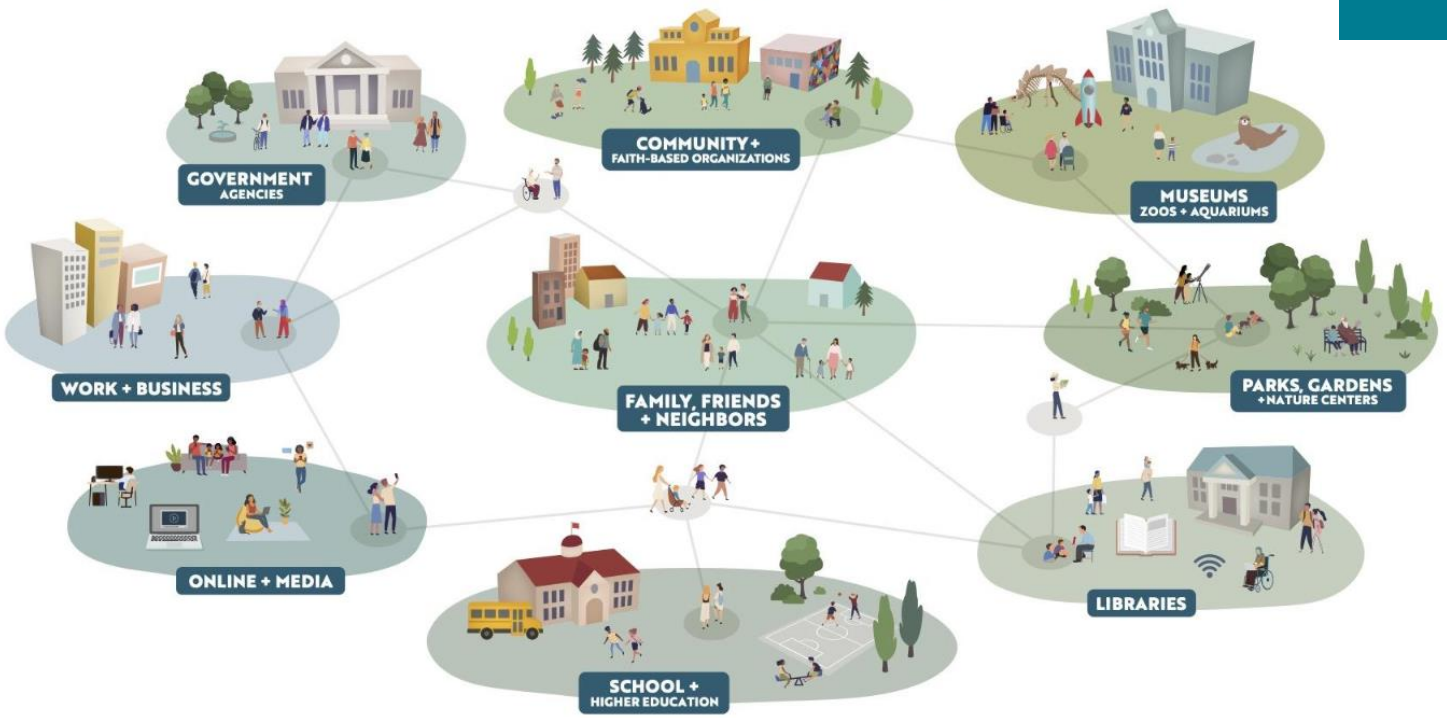

Rural Activation and Innovation Network (RAIN)
LIBRARIES
COMMUNITY ORGANIZATIONS
ECONOMIC DEVELOPMENT
FAMILY, FRIENDS & NEIGHBORS
TRIBAL NATIONS
HIGHER EDUCATION
MUSEUMS & PARKS
SCHOOLS
INFORMAL EDUCATORS
Arizona Science Center and Arizona State University
Rural Arizona


Smoky Mountains STEM Collaborative
GREAT SMOKY MOUNTAINS NATIONAL PARK
EDUCATORS
RESEARCH-BASED PROGRAMS
COMMUNITY COLLEGE
COMMUNITY GROUPS
FAMILY
EASTERN BAND OF THE CHEROKEE INDIANS
LIBRARIES
Southwestern Community College
Western North Carolina


Learning Ecosystems Northeast
4-H STAFF AND VOLUNTEERS
FAMILY, FRIENDS +NEIGHBORS
LIBRARIANS
TEACHERS
INFORMAL EDUCATORS
COMMUNITY-BASED KNOWLEDGE HOLDERS
Gulf of Maine Research Institute
Northeast

Discussion in chat

STEM Learning Ecosystems



What characteristics of STEM learning ecosystems resonate with you? *or*

How do or could you participate in a place-based STEM learning ecosystem?

Key Idea: Belonging

STEM Learning Ecosystems

KEY IDEAS

Belonging

Ecosystems can broaden participation by cultivating genuine relationships among individuals and organizations; creating a flexible and transparent culture; sharing programming and resources; and prioritizing a sense of belonging.

Belonging

Belonging refers to the feeling of being connected to a community, place, or situation, and being supported and welcomed there.

Structure and design

STEM learning ecosystems support belonging through their:

- Organizational structures and culture
- Relationships and communication
- Resources and activities

Smoky Mountains STEM Collaborative

Southwestern Community College

Western North Carolina

Belonging example

Smoky Mountains STEM Collaborative

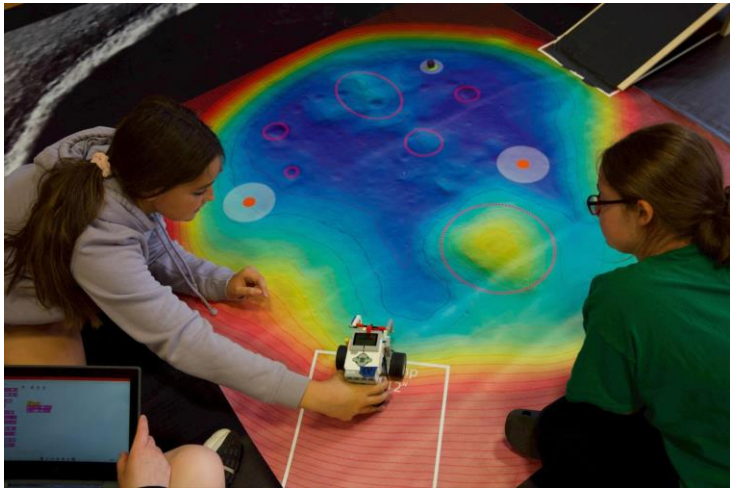
Goals:

- Provide opportunities for underserved and underrepresented communities in the Appalachians to become engaged in STEM throughout their lives
- Help youth identify academic and career opportunities in STEM

Belonging example

Showing up in their community:

- Continually attend events to build relationships (e.g. Art Walk, teacher professional development, STEAM Night)
- Through time, drop-in activities at the Boys & Girls Club developed into a relationship that supported a robotics club



Key Idea: Engagement

STEM Learning Ecosystems

KEY IDEAS

Engagement

Authentic STEM engagement starts with understanding what is relevant to learners and communities, then creates connections to content through active learning experiences.

Authentic STEM Engagement

Relevance

Connects to identity and culture, promotes a sense of belonging, and fosters inclusion

STEM content

Includes community observations, scientific data, assets, and a range of expert perspectives

Experience design

Supports active learning, encourages dialogue, and builds on community strengths


Arctic and Earth SIGNs
NASA GLOBE
COMMUNITY GROUPS
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INDIGENOUS COMMUNITIES & ELDERS
FORMAL EDUCATORS
ASSOCIATION OF INTERIOR NATIVE EDUCATORS
FAMILY & FRIENDS
University of Alaska Fairbanks
Alaska

Engagement example

Arctic & Earth SIGNs

- 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

Engagement example

Culturally sustaining learning framework:

- Starts with learning from Elders, long-term residents, and scientists
- Embraces multiple ways of knowing
- Braids together Indigenous knowledge and western science

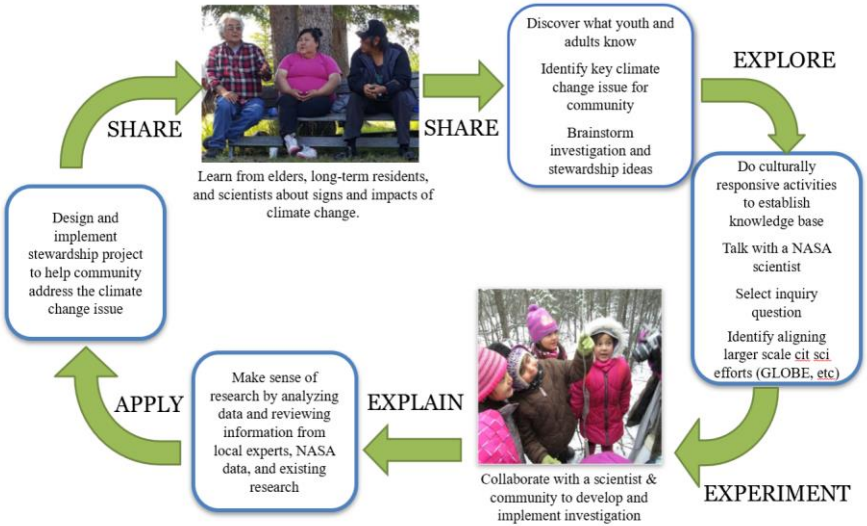

Figure from: Spellman, K. V., Sparrow, E. B., Chase, M. J., Larson, A., & Kealy, K. (2018). Connected climate change learning through citizen science: an assessment of priorities and needs of formal and informal educators and community members in Alaska. Connected Science Learning, 1(6), 1-24. https://www.nsta.org/connected-climate-change-learning-through-citizen-science

Wrap-up

Discussion in chat












Choose a picture and tell the group why it represents learning to you.

STEM Learning Ecosystems

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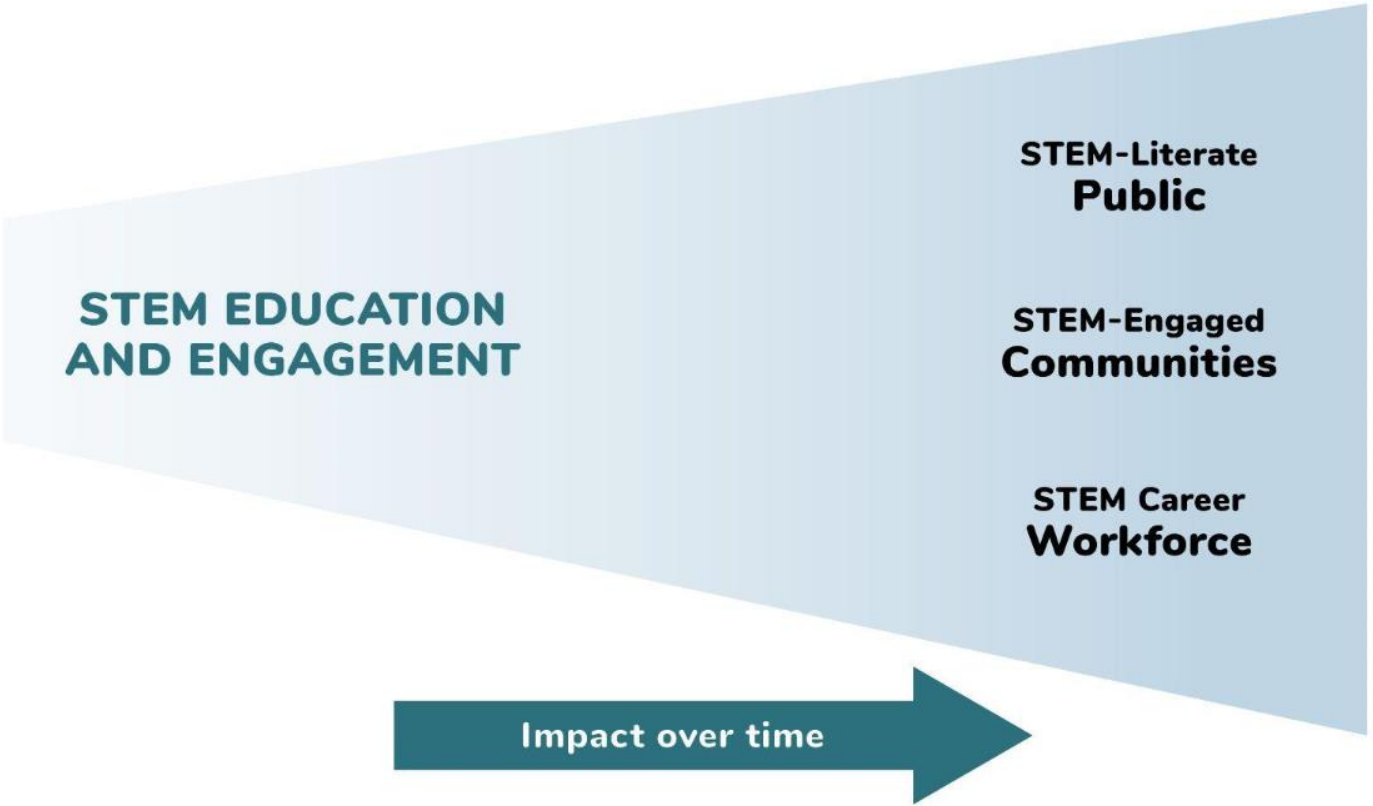
STEM Learning Outcomes



Final Reflection

&

Evaluation Question

Spend a moment reflecting, then share your thoughts in the chat.

You can answer one of these questions, or add an idea of your own:

- What is something from today's meeting that you're interested in following up on?
- Does the concept of STEM learning ecosystems resonate with you in any new ways? How?

Resources, reminders and Q&A

NISE Network resources

STEM LEARNING ECOSYSTEMS

Videos:

1. What Are STEM Learning Ecosystems?
2. Introduction to STEM Learning Ecosystems
3. Building and Supporting Strong Partnerships
4. Engaging Everyone in STEM Learning
5. Creating Authentic STEM Learning Experiences

Professional Learning Activities:

- What is Learning Conversation Starter
- Depict Your Partnership

Illustrations:

- STEM Learning Ecosystems Illustrations

https://www.nisenet.org/stem-learning-ecosystems

Additional resources

STEM Learning Ecosystem national network:

- Community of practice
- Convenings and online workshops
- Resources
- Newsletter
- Participating ecosystems: https://stemecosystems.org/ecosystems/

STEM ecosystems™

Connecting Communities, Fueling Growth

powered by ties™

https://stemecosystems.org/

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Thank You

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