



**Center for
Innovation
in Informal
STEM Learning
Arizona State
University**



**STEM LEARNING
ECOSYSTEMS**

CULTURALLY RESPONSIVE EVALUATION: A Study of Four Projects Using a Learning Ecosystems Lens

Rae Ostman, Allison Anderson, Ann Atwood,
Liz Kollmann, and the SciAct STEM Ecosystems team

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Presentation overview

- SciAct STEM Ecosystems project
- Learning ecosystems
- Culturally responsive evaluation
- Inquiry process
- Resources

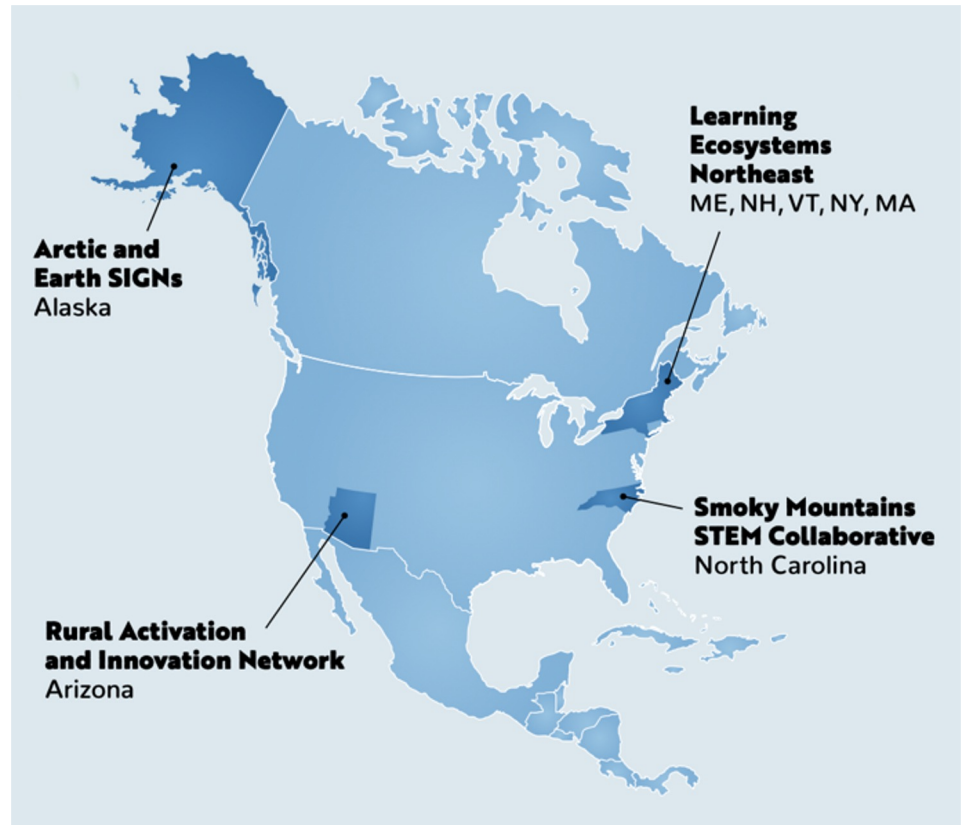


SciAct STEM Ecosystems project

- **NASA's Science Activation (SciAct)** program
- **Collaboration** of several teams in different areas of the US
- **Inquiry** to learn about principles and practices of projects designed to broaden participation in STEM learning, using an *ecosystems* lens and *culturally responsive evaluation* (CRE) methods
- **Findings** about community partnerships, fostering belonging, and authentic engagement

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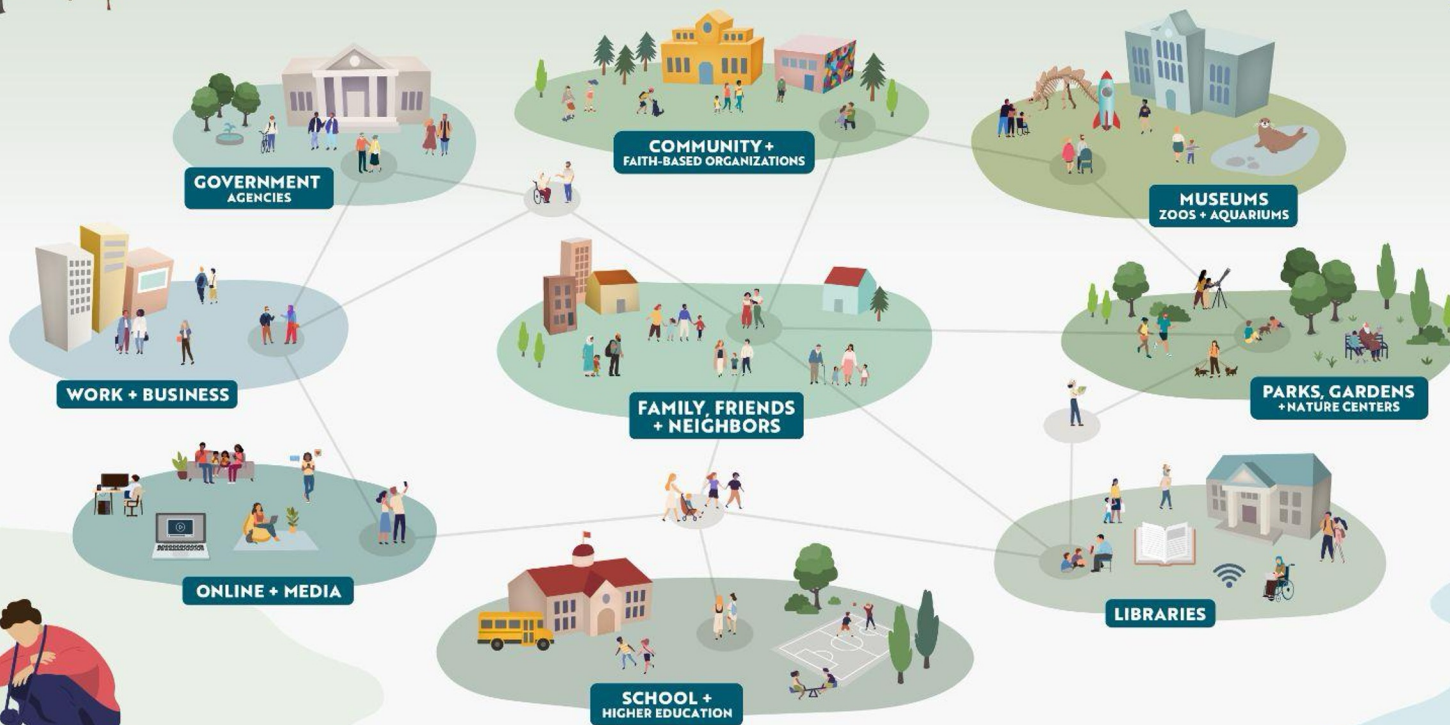
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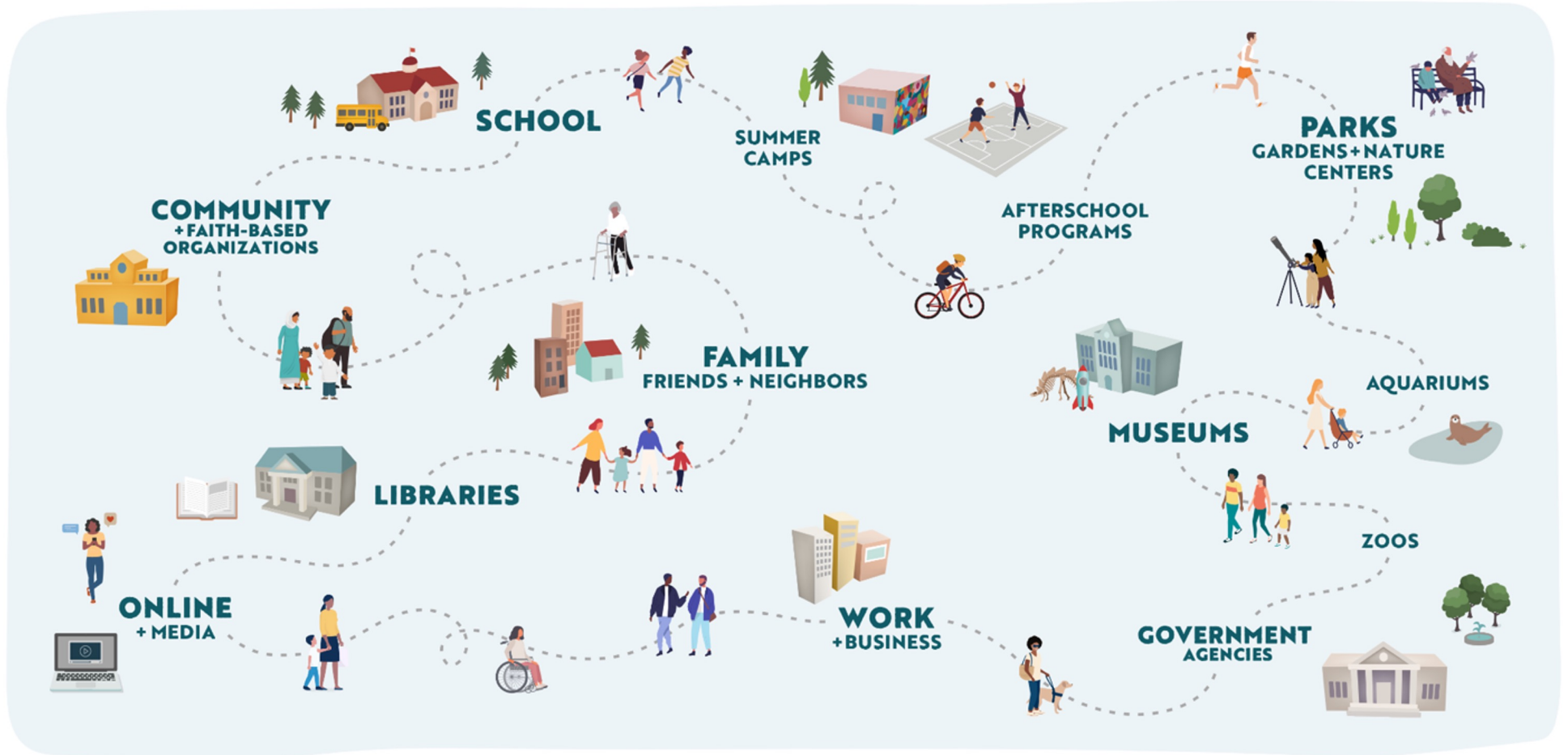
LEARNING ECOSYSTEMS

STEM Learning Ecosystems



STEM Learning Pathways

Different journeys for learning across a lifetime



CULTURALLY RESPONSIVE EVALUATION

Culturally responsive evaluation (CRE)

- Holistic framework that recognizes that culture is central to all evaluation
- Asks evaluators to recognize the values, beliefs, and culture that they bring to their work as well as the context in which the evaluation is taking place
- Recognizes the power imbalances that are inherent to evaluation and favors the cultures and viewpoints of groups that have been historically marginalized
- Shares principles and practices with other equity-focused evaluation methods

CRE principles

Planning and design

- Considers the composition of evaluation team and their assumptions and biases
- Engages partners and community members during all phases of the evaluation

Data collection

- Examines cultural and historical contexts and different worldviews
- Uses thoughtful methods for data collection

Analysis and dissemination

- Uses inclusive methods for data analysis
- Seeks accessible and actionable evaluation findings

Strategic Learning Partners for Innovation: <https://slp4i.com/matrix/>

CRE practices for planning and design

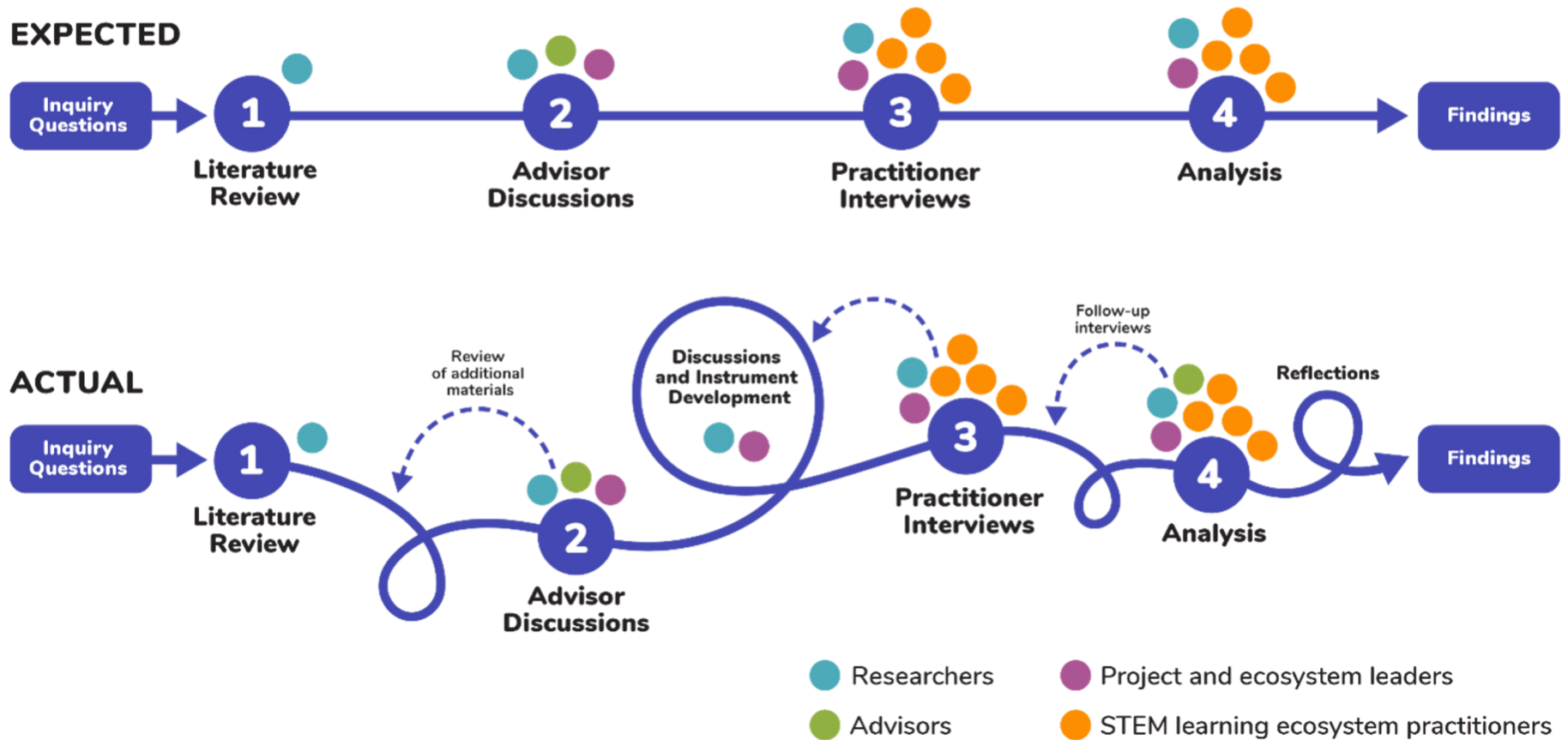
Planning and design

- Considers the composition of evaluation team and their assumptions and biases
- Engages partners and community members during all phases of the evaluation

Practices

- Use methods and tools that best serve the community
- Include diverse perspectives
- Reflect on cultural preferences and biases
- Incorporate ideas from all parties into the evaluation design
- Establish a climate of trust and respect

INQUIRY PROCESS



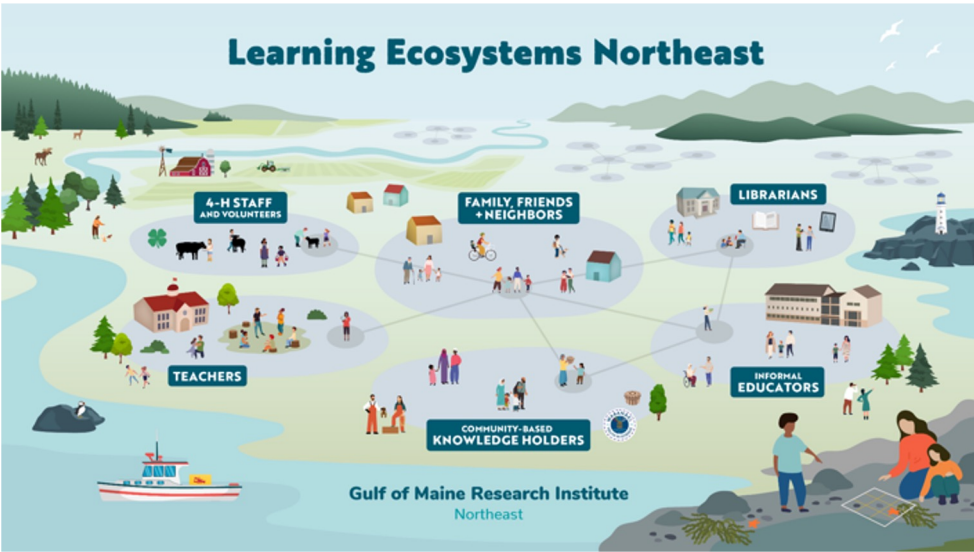
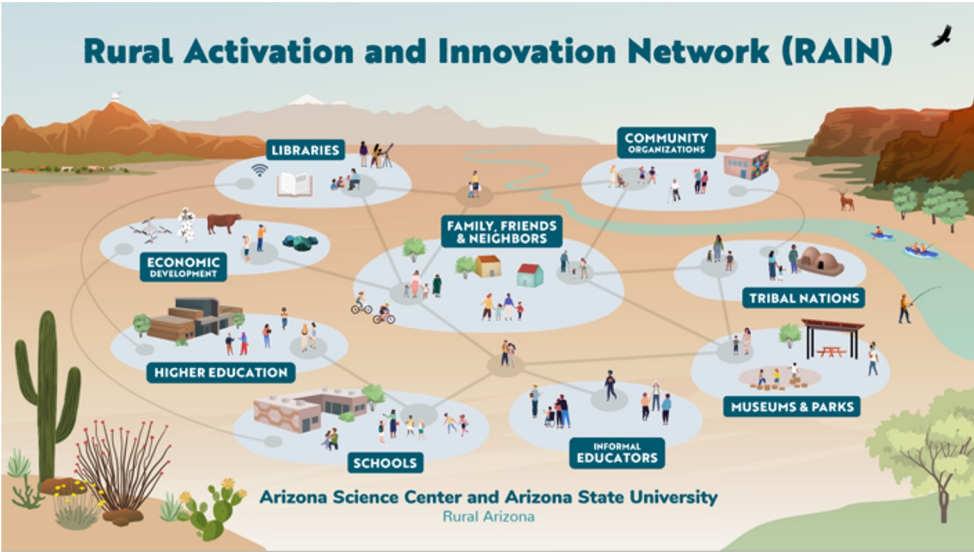
CRE practices for data collection

Data collection

- Examines cultural and historical contexts and different worldviews
- Uses thoughtful methods for data collection

Practices

- Attend to the geographic location, the program, and the people for each site
- Respect different ways of thinking, including indigenous and western perspectives
- Flexible instruments and protocols (different for each group)



CRE practices for analysis and dissemination

Analysis and dissemination

- Uses inclusive methods for data analysis
- Seeks accessible and actionable evaluation findings

Practices

- Review, discuss, and refine preliminary findings at multiple points
- Share back with participants
- Collaborate on dissemination with different communities (especially STEM engagement and education)
- Create different kinds of resources for different professionals

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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 diversity, equity, accessibility, inclusion, and belonging.



Engagement:

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



Team reflections on CRE

Reflections from the team

- This process felt different from other evaluations we have participated in
- Using an iterative inquiry process helped establish trust among team members
- Reflecting and discussing together has benefited all our work
- We feel collective ownership in the findings



RESOURCES

Resources - SciAct STEM Ecosystems

NISE Network website:

- Overview and findings
- Videos and conversation guide
- Activities
- Graphics



NISE NATIONAL INFORMAL
STEM EDUCATION
NETWORK

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

Resources - CRE

- Bledsoe, K., Gonzales, F., & Guillen-Woods, B. (2022). The Eval Matrix©. Strategic Learning Partners for Innovation <https://slp4i.com/the-eval-matrix>.
- Frierson, H. T., Hood, S., & Hughes, G. B. (2010). A guide to conducting culturally-responsive evaluations. In J. Frechtling (Ed.), *The 2010 user-friendly handbook for project evaluation*. Arlington, VA: National Science Foundation.
- Hood, S., Hopson, R. K., & Kirkhart, K. E. (2015). Culturally responsive evaluation: Theory, practice, and future implications. In K. E. Newcomer, H. P. Hatry & J. S. Wholey (Eds.), *Handbook of practical program evaluation* (4th ed.): Jossey-Bass.



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Ann Atwood Museum of Science (evaluator)

ECOSYSTEMS

Arctic and Earth SIGNs

Learning Ecosystems Northeast

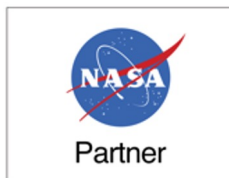
Rural Activation and Innovation Network

Smoky Mountain STEM Collaborative

Thank you



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