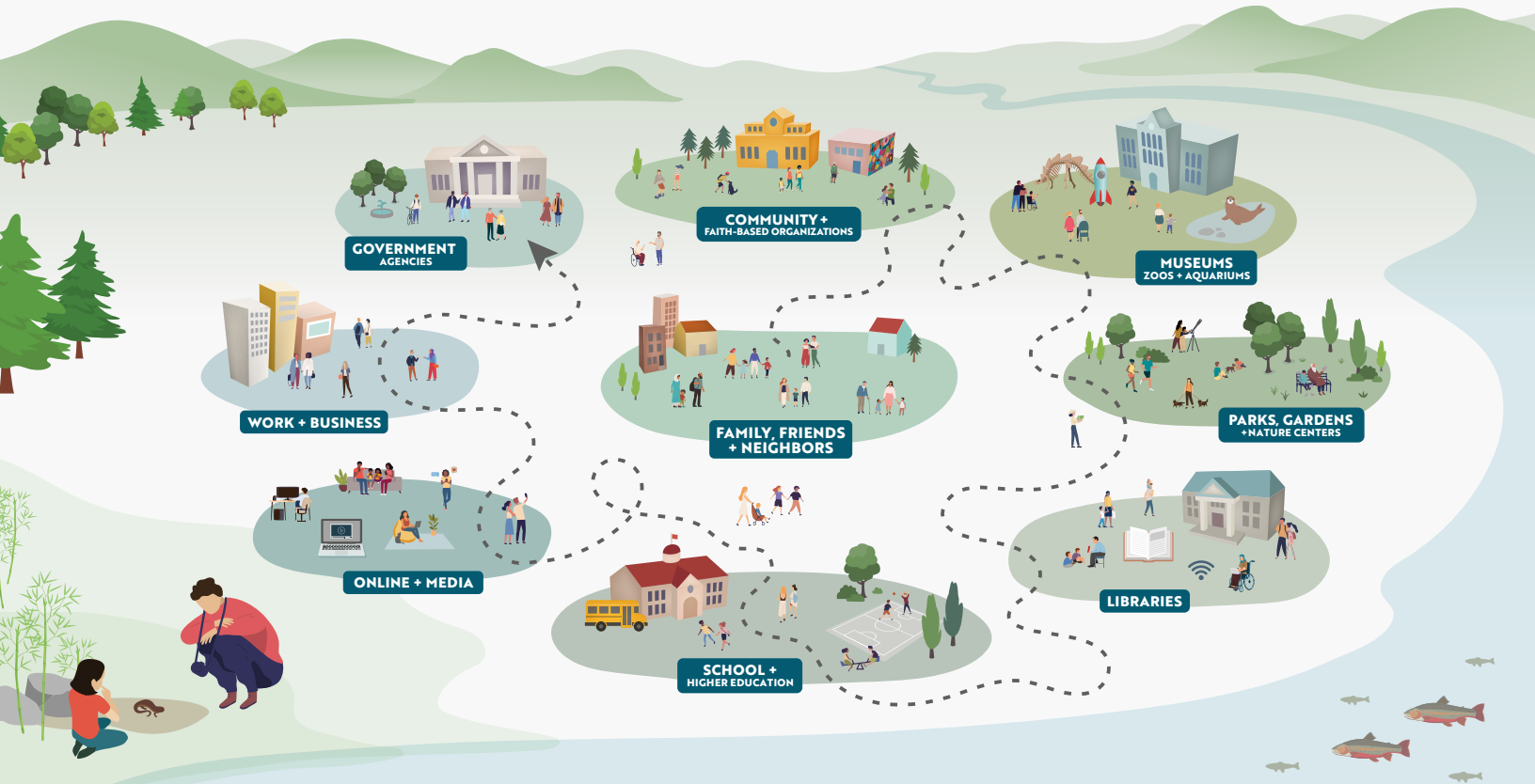# STEM Learning Ecosystems

STEM learning ecosystems are intentionally designed, community-wide partnerships that enable people to actively participate in STEM throughout their lives. Partners can include educational and cultural institutions, community and faith-based organizations, businesses, government agencies, and many more. Place-based learning ecosystems are responsive to their local context and draw on expertise and resources across a community to create experiences that are relevant to local learners.

GOVERNMENT
AGENCIES

COMMUNITY +
FAITH-BASED ORGANIZATIONS

MUSEUMS
ZOOS + AQUARIUMS

WORK + BUSINESS

FAMILY, FRIENDS
+ NEIGHBORS

PARKS, GARDENS
+NATURE CENTERS

ONLINE + MEDIA

LIBRARIES

SCHOOL +
HIGHER EDUCATION

**Arctic and
Earth SIGNs**
Alaska

**Learning
Ecosystems
Northeast**
ME, NH, VT, NY, MA

**Smoky Mountains
STEM Collaborative**
North Carolina

**Rural Activation
and Innovation Network**
Arizona

Project overview

We used the concept of a STEM learning ecosystem to study four projects that are part of NASA's Science Activation program, located in Alaska, Arizona, North Carolina, and several states in the northeastern US. We wanted to understand how collaborations can support strong relationships across diverse partners, create inclusive and accessible opportunities to learn about Earth and space science, and promote equity and belonging in STEM. We summarized what we learned from our inquiry in three 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.

- *Diversity refers to the ways in which people are similar and different,* including identities, social positions, lived experiences, values, and beliefs.
- *Equity means providing different people with fair access to resources* so they can participate fully in society and meet their own needs.
- *Accessibility means accommodating everyone* along the continuum of human ability and experience.
- *Inclusion is valuing diverse ideas, backgrounds, and perspectives* and creating an environment of involvement, respect, and connection.
- *Belonging refers to the feeling of being connected* to a community, place, or situation, and being supported and welcomed there.

Engagement

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

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
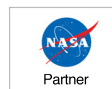
Resources

The STEM Learning Ecosystems team has professional learning resources available for free download from the NISE Network: **nisenet.org/stem-learning-ecosystems**

ASU Center for Innovation in Informal STEM Learning Arizona State University

ARCTIC & EARTH STEM INTEGRATING GLOBAL & LOCAL

Smoky Mountains STEM COLLABORATIVE

RAIN rural activation and innovation network

Learning Ecosystems Northeast

NISE NATIONAL INFORMAL STEM EDUCATION NETWORK

NASA Partner