Developing Geo-STEM Learning Ecosystems

... Creating More Diverse, Inclusive, and Resilient Communities Engaged in the Geosciences

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Origins of STEM Learning Ecosystems

2014: [STEM Learning is Everywhere](#), a Summary of National Academies of Science Convocation on Building Learning Systems, focused on K-8

2018: [Charting a Course for Success: America’s Strategy for STEM Education](#), the new Strategic Plan for STEM education. It presents a vision for a future where all Americans have access to high-quality STEM education; expands STEM learning ecosystems to all citizens
### Pathways and Objectives

**Pathways**
- Develop and Enrich Strategic Partnerships
- Foster STEM Ecosystems that Unite Communities
- Increase Work-Based Learning and Training Through Educator-Employer Partnerships
- Blend Successful Practices from Across the Learning Landscape

**Objectives**
- Engage Students where Disciplines Converge
- Advance Innovation and Entrepreneurship Education
- Make Mathematics a Magnet
- Encourage Transdisciplinary Learning
- Build Computational Literacy
- Make Computational Thinking an Integral Element of All Education
- Expand Digital Platforms for Teaching and Learning

**Cross-Cutting Approaches**
- Operate with Transparency and Accountability
- Leverage and Scale Evidence-Based Practices Across STEM Communities
- Report Participation Rates of Underrepresented Groups
- Use Common Metrics to Measure Progress
- Make Program Performance and Outcomes Publicly Available
- Develop a Federal Implementation Plan and Track Progress
STEM Learning Ecosystems

- Most provide K-8 education

- Focus is on medicine, technology, robotics, and engineering
  - Incredibly effective in changing peoples’ thinking about computer science and
    - Who can do CS?
    - What kinds of jobs are there in CS?
    - How old do kids have to be before introducing and learning CS?

- Minimal focus on geosciences or environmental, resource, disaster issues
Community organizations develop systemic collaborations that engage learners from all walks of life, facilitate enduring and effective STEM learning opportunities, elevate community literacy and innovation, improve networks, and activate sustainable and transformative solutions for the broader community.
STEM Learning Ecosystems
A Conceptual Model
Inputs and Collaborations

- Infrastructure
- Direction and Vision
- Accessibility
- People
- Natural Resources
- Financial Support
- Time
- Leadership
STEM Learning Ecosystems

A Conceptual Model
Broadening Participation

Build a stronger and more diverse workforce

Developing Communities of Practice
Examples of Geo-STEM Learning Ecosystems

THRIVING EARTH EXCHANGE

SEAS
SUPPORTING EMERGING AQUATIC SCIENTISTS

EarthConnections
Community Pathways to Geoscience Careers
Discussion --

What are you thinking so far?

What examples of STEM Learning Ecosystems are you a part of?

How can you build on these to make them stronger?
Links from our Round Table Discussion

- STEM Learning is Everywhere
- 2018 US STEM Strategic Plan
- STEM Learning Ecosystems Communities of Practice
- EarthConnections
- Thriving Earth Exchange
- SEAS
- Epic-N
- Communities of Practice
- GEOPAths Solicitation
- Assessing STEM Learning Ecosystems
- Assessing Communities of Practice