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Reflections on Connected Learning, Personal Learning Ecologies, and Informal Science Education

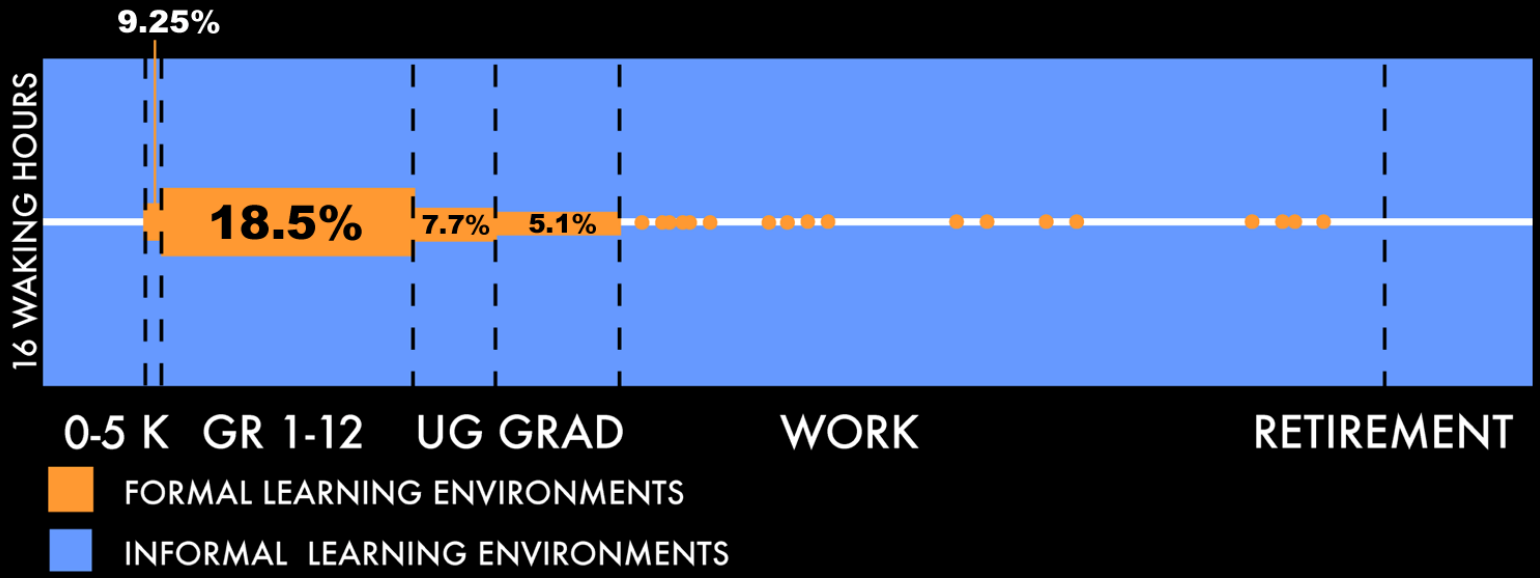
Mid-Winter Virtual Conference
Cyberspace
January 29, 2016

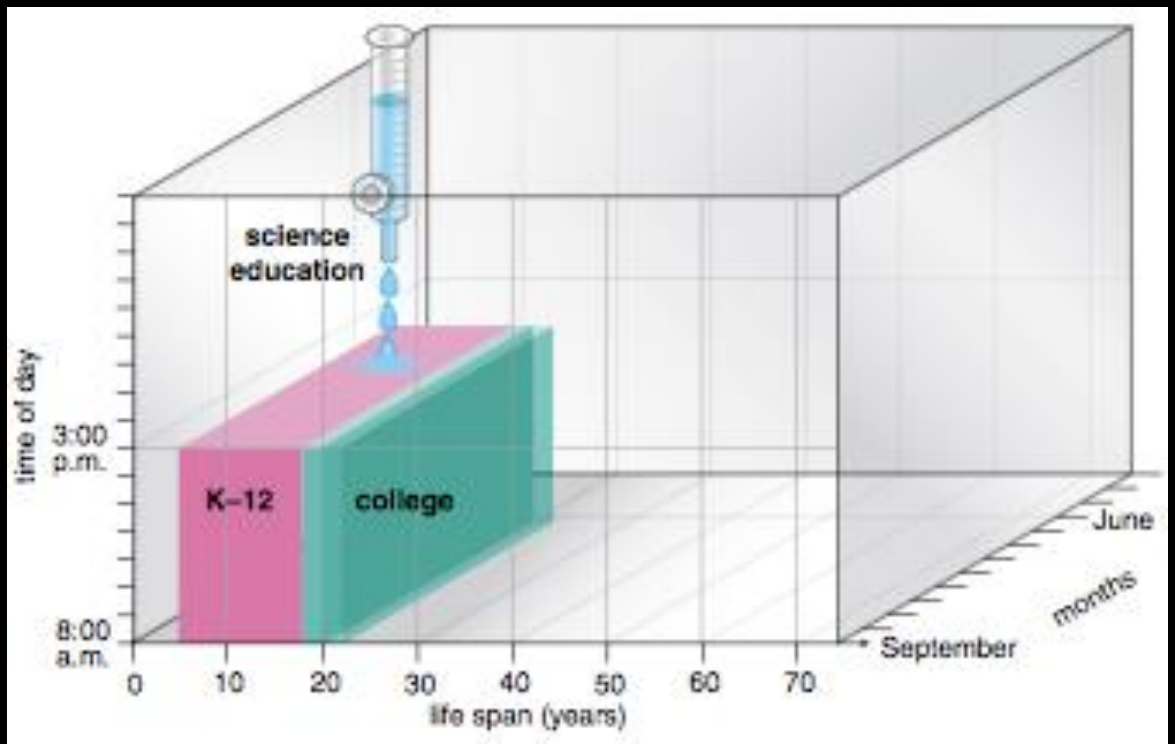
What is learning?

- Part of evolution: adapt to the physical and social environment
- Ongoing process: like our heart, the brain does not stop
- Somewhat conservative: preserve, and build on tried and true
- Individual and need-based: everyone has a different personal sphere
- Collective and group-based: We are all embedded into social environments

What is a personal learning ecology?

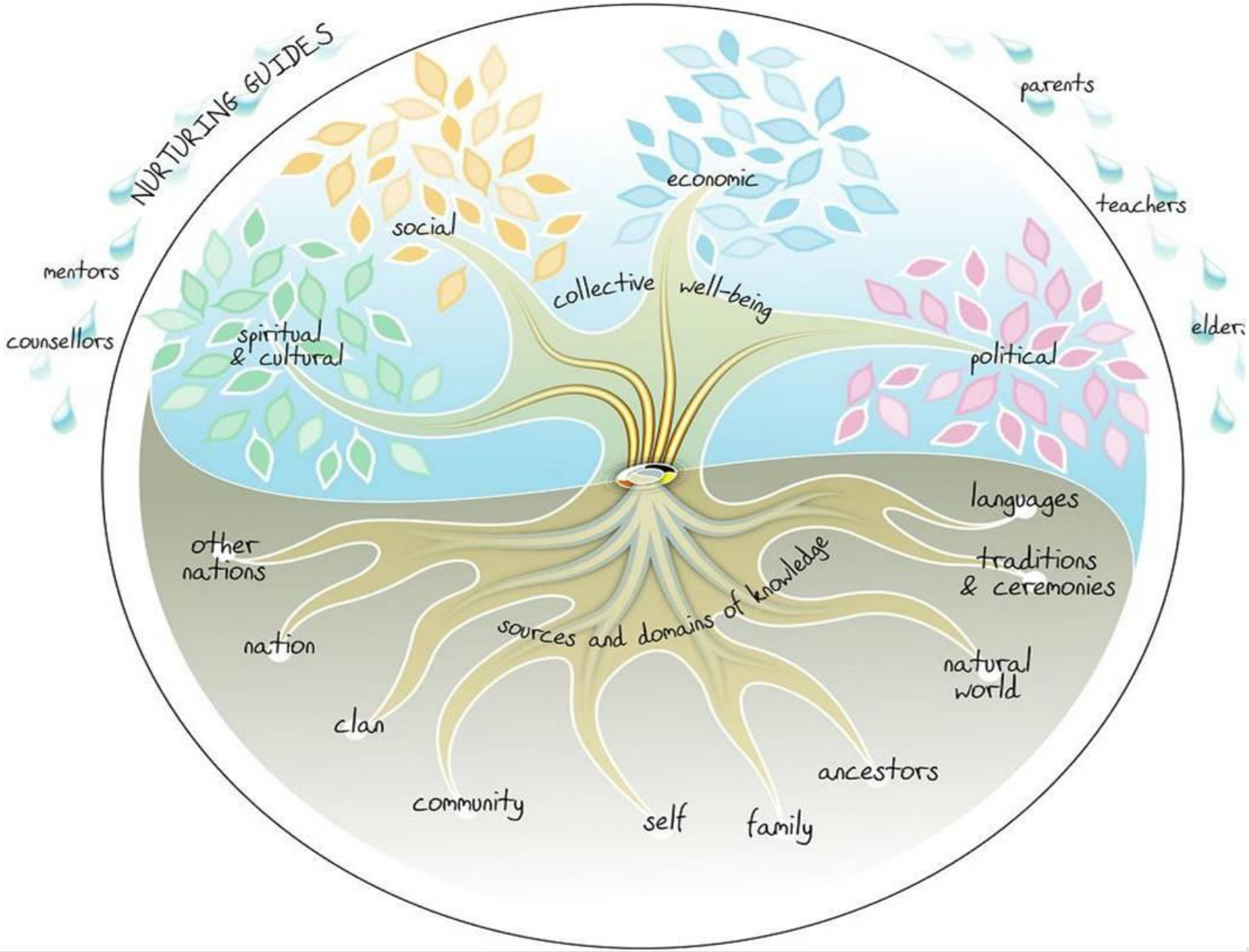
LIFELONG AND LIFEWIDE LEARNING





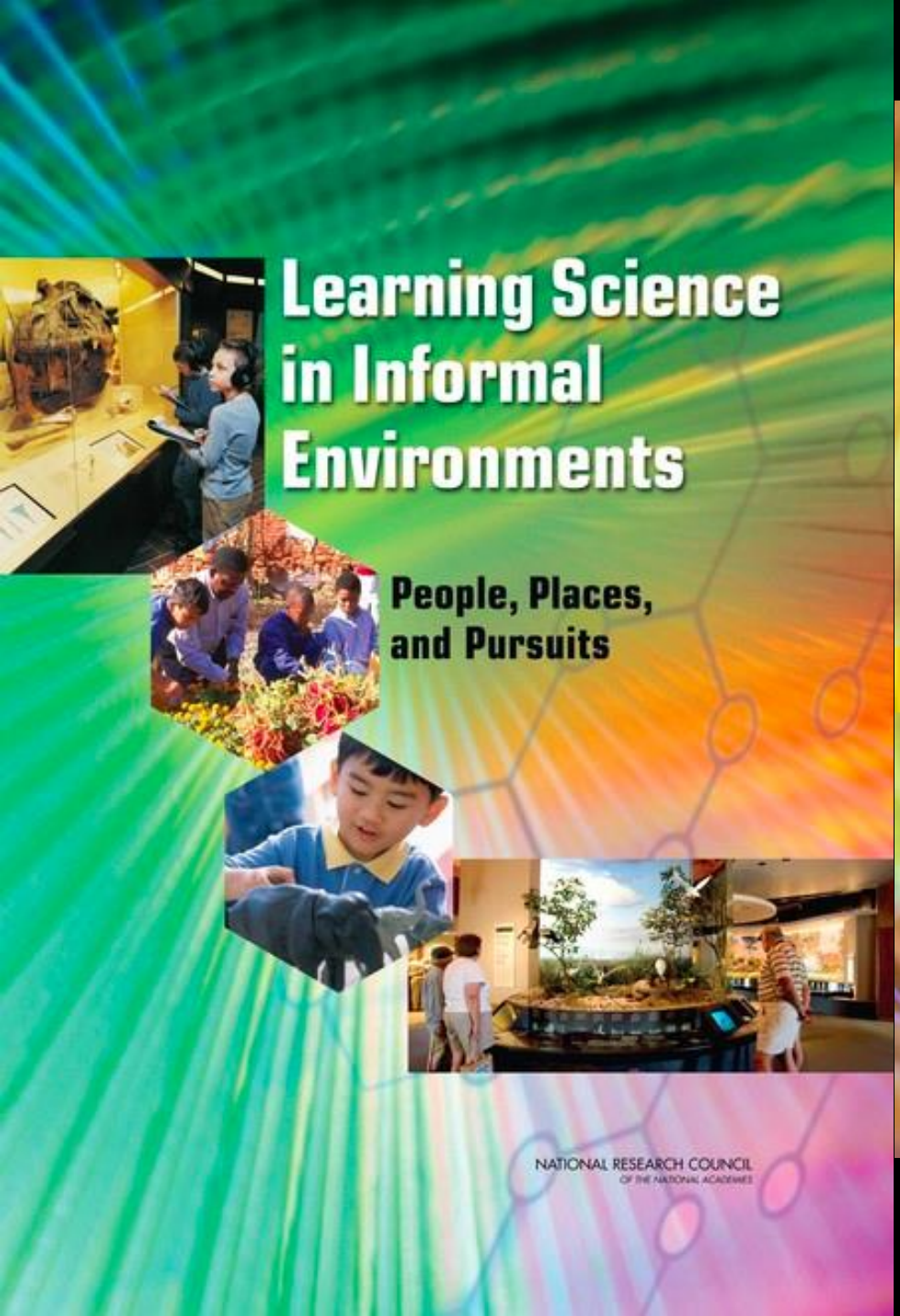

Policies
Regulations
Funding
Museum
Internet
School
Media
Caregivers
CBO
Mentor
Role Models
Hobby Club
Culture
Norms
After-school
Peers
Library
Friends
Family
4-H
Church
Values
Boys and Girls Club
Sport
Social Cohesion
Community

First Nations Holistic Lifelong Learning Model



What is connected learning?

1. Make the personal learning ecology explicit to the learner
2. Actively facilitate connections between learning experiences within an individual learning ecology
3. Create community capacity to link institutions in ways that synergies rather than compete
4. Train educators and other facilitators of learning about making use of a the full spectrum of the existent learning ecology
5. Use community capacity to expand the local learning ecology
6. Celebrate the learning ecology and link it to quality of life


Learning Science in Informal Environments
People, Places, and Pursuits
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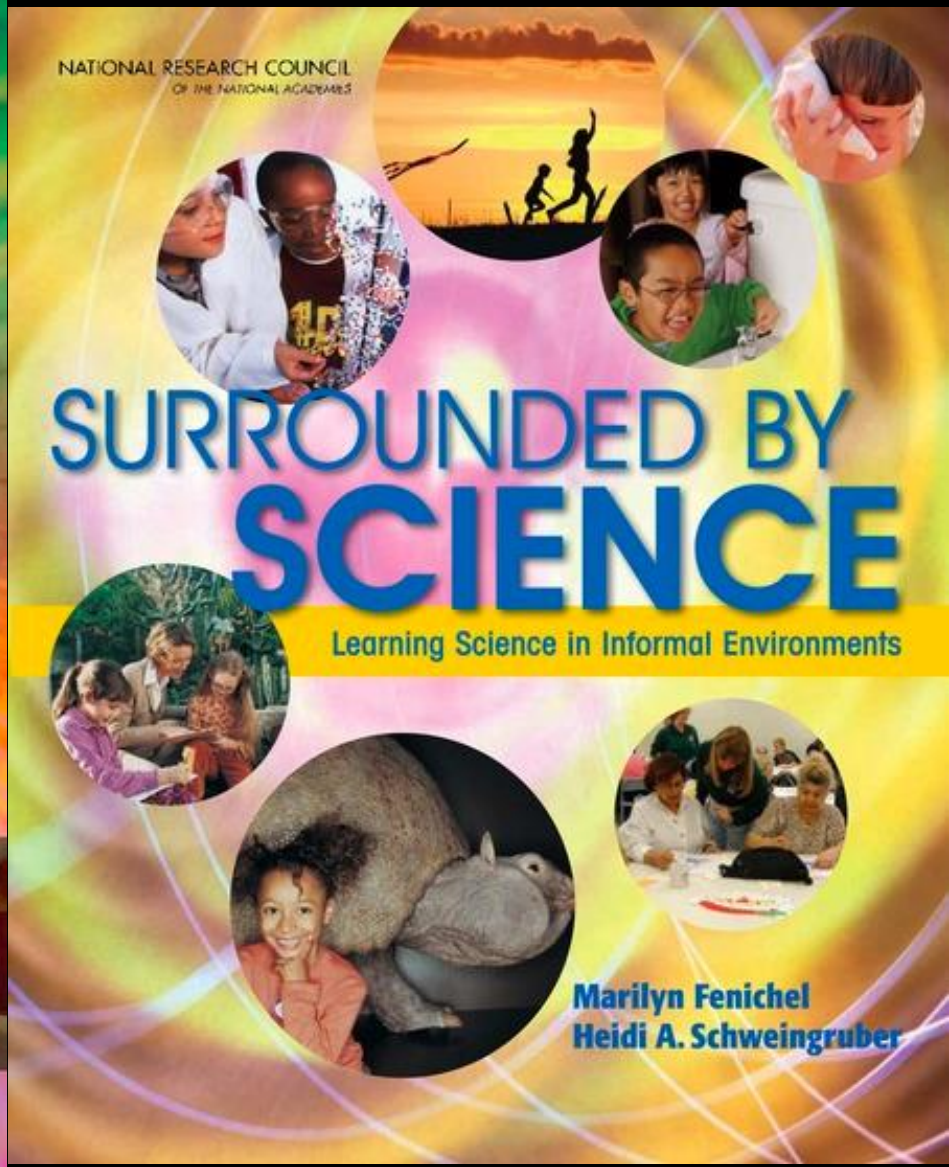
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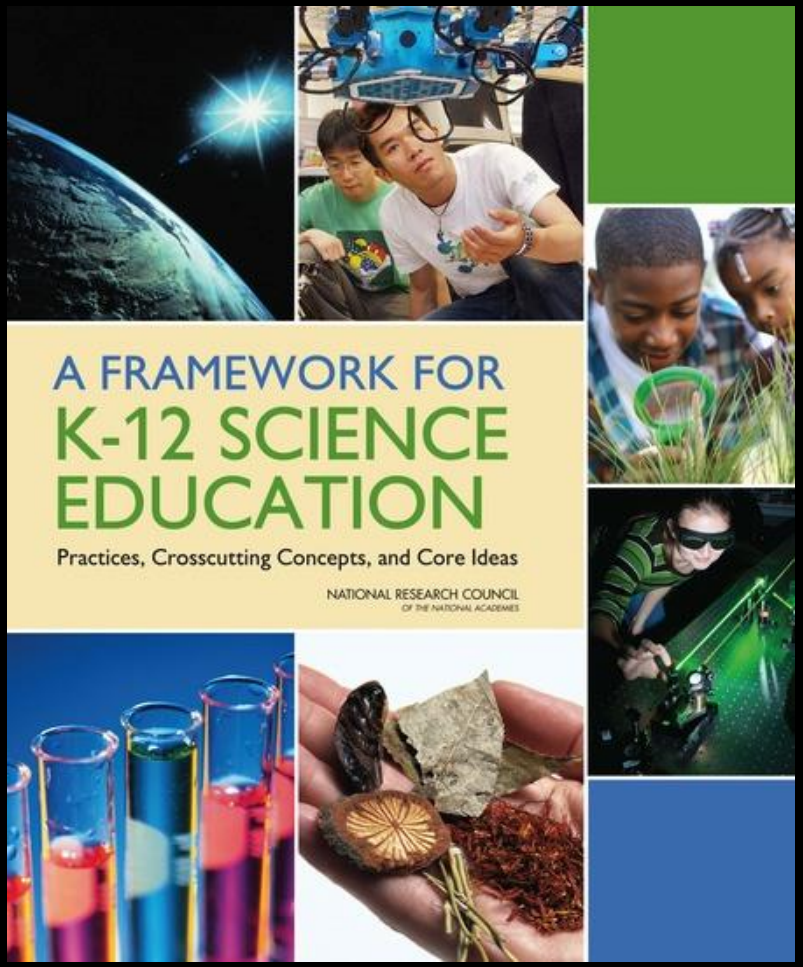
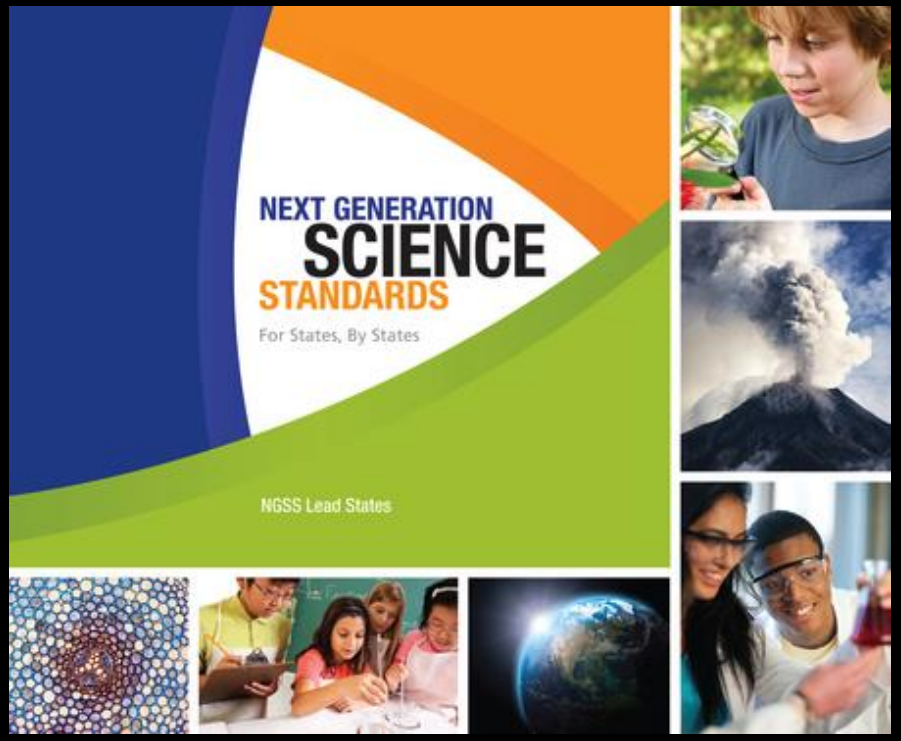
SURROUNDED BY SCIENCE
Learning Science in Informal Environments
Marilyn Fenichel
Heidi A. Schweingruber

Strands of science learning provide a glue between learning ecologies

1. Experience excitement, interest, and motivation to learn about phenomena in the natural and physical world.
2. Come to generate, understand, remember, and use concepts, explanations, arguments, models, and facts related to science.
3. Manipulate, test, explore, predict, question, observe, and make sense of the natural and physical world.
4. Reflect on science as a way of knowing; on processes, concepts, and institutions of science; and on their own process of learning about phenomena.
5. Participate in scientific activities and learning practices with others, using scientific language and tools.
6. Think about themselves as science learners and develop an identity as someone who knows about, uses, and sometimes contributes to science.

More glue and opportunity to strengthen learning ecologies exist when formal science education incorporates elements commonly associated with informal science education…





The NGSS Model

Practices

1. Asking questions & defining problems
2. Developing & using models
3. Planning & carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics & computational thinking
6. Constructing explanations & designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, & communicating information

Content

- Physical Sciences
- Life Sciences
- Earth & Space Sciences
- Engineering, technology, applications

Crosscutting Concepts

- Patterns
- Cause & Effect
- Scale, proportion & quantity
- Systems & systems models
- Energy & Matter
- Structure & Function
- Stability & change

The NGSS Model

- Performance expectations
- Create understanding that allows to solve problems and explain phenomena
- Has disciplinary significance and relevance to peoples' lives
- Is "generative" in that it motivates further exploration
- Develops over time in "learning progressions"
- Is doable

Non scholae sed vitae discimus: “21st Century Skills”

- Social skills: communication, reasoning, empathy, tolerance
- Learning skills: knowing how to learn, identity as learner, self-efficacy, self-reliance
- Thinking skills: non-routine problem solving, creative thinking, innovative thinking
- Decision skills: deciding under uncertainty, optimizing, commitment
- Implementation skills: persistence, resilience, risk-taking, harnessing and using resources, goal orientation

Identifying and Supporting Productive STEM Programs in Out-of-School Settings

Committee on Successful Out-of-School STEM Learning

Board on Science Education
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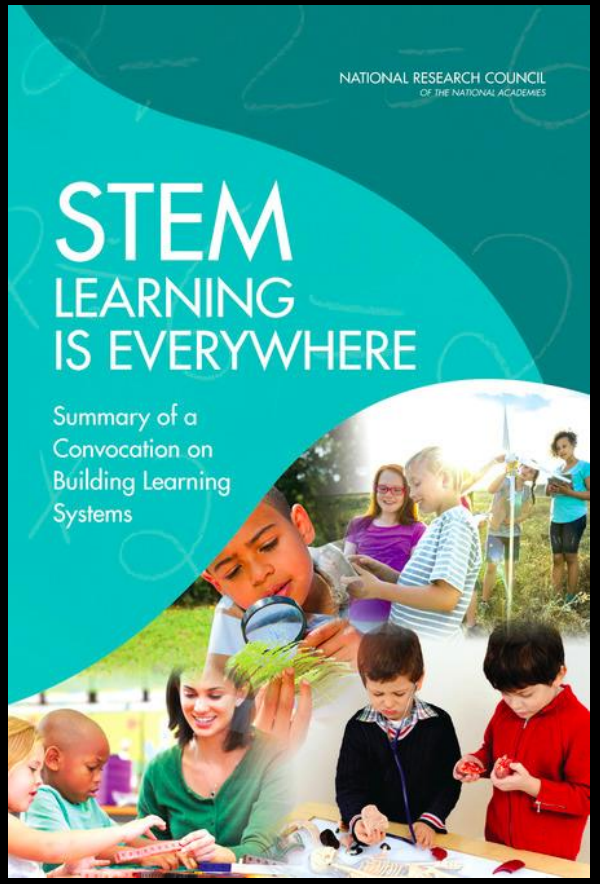

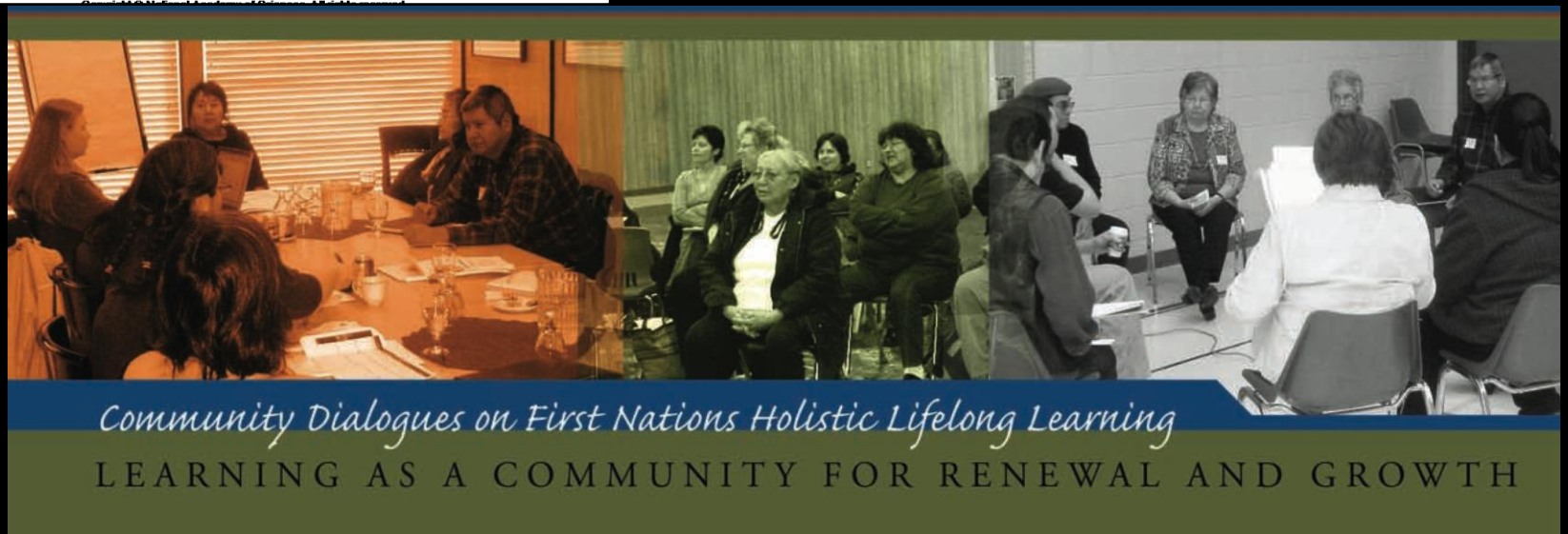

A STEM learning ecosystem includes all of a community's STEM-rich assets

- Designed settings, such as schools, clubs, museums, and youth programs;
- Naturalistic settings, such as city parks, waterways, and forests and deserts;
- People and networks of people, such as practicing STEM professionals, educators, enthusiasts, hobbyists, and business leaders who can serve as inspiration and role models;
- Everyday encounters with STEM, such as on the internet, on television, on the playground, or during conversations with family members and other young people.

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