Group 11-C Informal Education

By Renee Clary, Beth McLarty Halfkenny, Sarah Mardon, Erika Vye, Chris Higgins, Jim Davis, Marissa Schorr, Zachary Salus, Polly Sturgeon, Kristen Janssen, Lorrie Ward, and Lesley Hymers

Informal Education

- Occurs outside of standard formal settings (K-12, college)
- Involves free-choice learning
- Includes all types of educational settings/opportunities (not just museums, science centers)

The Role of State and Provincial Geological Surveys in Informal Education
By Chris Higgins (California Geological Survey)

- State and Provincial Geological Surveys can help survey and inventory local geosites across their States
- Surveys can better convey informal education material via adopting a more standardized/consistent approach to outreach and education across the continent.
- This could lead to a clearinghouse approach, where informal education material could be uploaded from many different surveys to have in a singular place.
- Many survey websites lack a dedicated geoheritage page.
- These concepts could help geoscience and non-geoscience partners in developing informal education materials for geoheritage projects

Geosite Inventory for Informal Education

By Beth Halfkenny (Carleton University)

- State and Provincial Geological Surveys can provide geosite identification and classification.
- There may also exist geoheritage materials, but they may not be under the geoheritage banner, such as Geology Guidebooks and Geological Highway maps
- Informal educators can help develop interpretation for new or potential local geosites at all levels.
- **Discussion Points**
- Developing a continent-scale repository for geosite information with consistent criteria and terminology.
- A North American Storymap?

How to Increase Accessibility for Geoheritage Sites

By Sarah Mardon (Kentucky Geological Survey)

- Create an inventory of facilities that have virtual visits or accessibility options.
- We can learn from existing facilities that have accessible trails, sensory gardens, and signage in Braille. The organization Nature for All provides a directory of Braille trails and sensory gardens worldwide: http://www.natureforthеblind.com/home.
- Various organizations including admissions office in higher education and the national park service use virtual visits to help people experience and view a place when in-person visits are not an option.
- Consult stakeholders about accessibility opportunities at a given site.
- Consider creating options for accommodating differences such as color blindness.
- Provide geoheritage informal education materials in multiple languages to reach a broader audience.

Leveraging Informal Education in K-12 Classrooms
By Renee Clary (Mississippi State University)

- School-age children receive most of their learning through informal means
- Two Major Resources: The Next Generation Science Standards and The Earth Science Literacy Initiative
  - Using the Next Generation Science Standards Disciplinary Core Ideas (DCIs) can form a basis to leverage informal education.
  - Earth Science Literacy Initiative has 9 Big Ideas that transcend disciplines.
- This should facilitate development of pathways/programs to interest students in careers in Geosciences.
  - K-12 and informal science centers are willing to work together to integrate formal education in informal spaces.

Connecting Local Geosites to Broader Geoscience and Earth Science Narratives
By Zachary Salus (Forest Preserve District of Cook County)

- Geology is full of processes that fit nicely into narrative formats.
  - The process of a glacier advancing and receding has really defined rising and falling action.
  - Fossils have interesting tales of how they become their modern counterparts.
  - There are also enough good mysteries in the geoscience/geoheritage to fill several seasons of law and order
- Interdisciplinary Narratives
  - Geology plays an important role in local history, with characters playing roles of all sorts.
  - Many sites have had fabulous discoveries over the years and thrilling discovery stories.
  - Geology plays an important role in the lives of bugs, birds, and plants.
- For an example, check out the book, Locust, by Jeffrey Lockwood
  - This book documents the author's journey to find rocky mountain locust specimen preserved in Rocky Mountain Glaciers to determine what happened North America Greatest Insect Pest.

The Value of the Virtual Field Trip

By Lorrie Ward (Cook County Forest Preserves)

Advantages:	Disadvantages:
● Cost-effective ● Increases motivation to pursue geosciences ● Can integrate multimedia, such as simulations into field trips. ● More Accessible and Adaptable to Curriculums ● No Size or Geographic Limitations ● More inclusive to all students physical needs ● Can be used in combination with on-site field trip to enhance learning experience	● Not using all of the senses ● Lost out on teamwork ● Lack of Field Work ● Time-consuming to create ● Technological limitations ● Potential lack of student engagement

In a survey sent to teachers who visit Sagawau (Cook County Forest Preserves) for earth science field trips or have done a virtual earth science field trip with Sagawau this year, all teachers believed there to be value in virtual field trips and would use them again or consider using them in them in the future.

Funding Informal Education

By Marissa Schorr (Mammoth Cave National Park)

- Applicable Grants for Informal Education in Geoheritage
  - GSA E-An Zen fund for Geoscience Grant
  - Paleontological Society Outreach and Education Grant
  - NSF Advancing Informal STEM Learning (AISL)
  - NSF INCLUDES: (For underrepresented minorities in STEM to fund projects)
  - More in the links for this presentation
- Local groups and universities may also have funding for local projects
- Other opportunities for discussing geoheritage are science cafes.

Visual Media & Design in Geoheritage Research and Education

By Kristen Janssen (Alaska Division of Geological and Geophysical Surveys)

Design and visual media are an important element of science communication, education, and fostering engagement and interest, with examples including:

- **Visual Display Boards and Signage**
- **Public Art (Murals, Sculpture, and Earth Art)**
- **Augmented/Virtual Reality Programs**
- **Artist in Residence Programs**
- **Illustrations and Schemata in Publication, Print, and Digital Outreach Material**
- **Social Media**

Geoscience professionals should take advantage of resources (through collaboration & learning new skills) to incorporate design, illustration, and narrative storytelling in their work to appeal to the general public and other groups.

Interpretation and Geoheritage

By Polly Sturgeon (Indiana Geological and Water Survey)

- Interpretation is a **communication process** that provides **connections** between a resource (artifact, collection, natural resource) and the interests of the audience.
- Interpretation was first credited to John Muir in terms of Geology in 1896 … *"I will interpret the rocks, learn the language of the flood, storm, and avalanche."*
- Interpretation and Social Media
  - Imagery is key
  - Try to utilize digital objects
  - What are you asking your users to do?

Diversity Equity, and Inclusion in Geoheritage

By Erika Vye (Great Lakes Research Center, Michigan Tech)

- Align programs and interpretation with the core values, beliefs, and concerns of the community.
- Work in partnership with people who represent the community to develop accessible and diverse programs that support social equity and multi-directional learning.
- Acknowledge that not all cultures have the same connections or relationships with nature; imagery and places are powerful and may ignite generational trauma.
- Consider the language represented within communities for presentations, signage, and other interpretive resources - is it welcoming? Inclusive?
- Learning and teaching about our Earth is not a linear experience, other ways of knowing enriches people’s understanding and facilitates multi-dimensional understanding.
- Informal outreach has the capacity to inspire geoscience careers, we need to have role models that all members of the community identify with.

Reinvigorating Geological Assets in Canadian National Parks
By Leslie Hymers (Mining Matters)

- Many parks have geoheritage/geological assets that may not be communicated to the public with the same importance as natural heritage.
- Geologist-in-Residence Program
  - 2 week period where a geologist provides interpretation on geoheritage topics to the general public, and information sessions to staff .
  - This is being tested in the Pukaskwa Park Pilot Program.
  - This also involves developing interpretive signage along the South Headlands Trail .

Urban Geoparks

By Jim Davis (Utah Geological Survey)

- A large number of Americans are urbanites, increasing the need for outdoor recreation and field trip destinations in Cities.
- There is a growing need for Geoscience Field Trip Locations, within walking distance from schools.
    - Sites, such as Burial Grounds and Boulder/Rock Gardens incorporated into Municipal Parks need to be developed geosites, with activities for multiple grade levels
- Science Field Trips need to be a standard in education. Developing urban geosites can guarantee urban students Earth Science Field Trips.

General Ideas

- Accommodate all audiences in applying informal education to geoheritage sites
- Recognize different learning styles and ways of knowing
- Informal education applies to all scales of geoheritage sites (local to regional, national, continent, world)
- Educating about geoheritage sites - consider “hybrid” approach
  - Visiting in-person
  - Visiting “virtually”
  - Museums, science centers, etc. as go-betweens
- Include non-geoscientists in design of educational products for sites
- Evaluate geoheritage opportunities when planning geoscience projects and develop companion educational products when feasible

Extended Bibliography

The Role of State and Provincial Geological Surveys in Informal Education

- Link to Document: GHInformalEdTopicHiggins.docx - Google Docs
- More Links:
  - https://www.stategeologists.org/surveys
  - https://www.nps.gov/subjects/geology/unofficial-register.htm

Geosite Inventory for Informal Education

- Link to Documents:
  - AM geoheritage B presentation.pptx - Google Slides
  - Geosite development fr grp 3.docx - Google Docs

How to Increase Accessibility for Geoheritage Sites

Leveraging Informal Education in K-12 Classrooms

- Links:
  - https://docs.google.com/document/d/15uanoFw6udOmMaPwKNzVK6Mlap5AtSwoVmcc8jOgnSA/edit
  - Next Generation Science Standards (nextgenscience.org)
  - Earth Science Literacy Initiative - ESLI

Extended Bibliography P2.

The Value of Virtual Visits

- Link found here: THE VALUE OF VIRTUAL VISITS.pptx - Google Slides

Funding Informal Education

- Link Found Here: Geoheritage Funding.docx - Google Docs
- Additional Resource: https://www.informalscience.org/

Visual Media & Design in Geoheritage Research and Education

- Link Found Here: JANSSEN_visualmediaingeoheritage.pptx - Google Slides

Interpretation and Geoheritage

- Link Found Here: PS_InterpretationGeoheritage.pptx - Google Slides

Extended Bibliography P3.

Diversity, Equity, and Inclusion in Geoheritage

- Link here: DEI GH Outreach_Vye .docx - Google Docs