



A Modeling Activity

Place based teaching-
finding a sense of place...

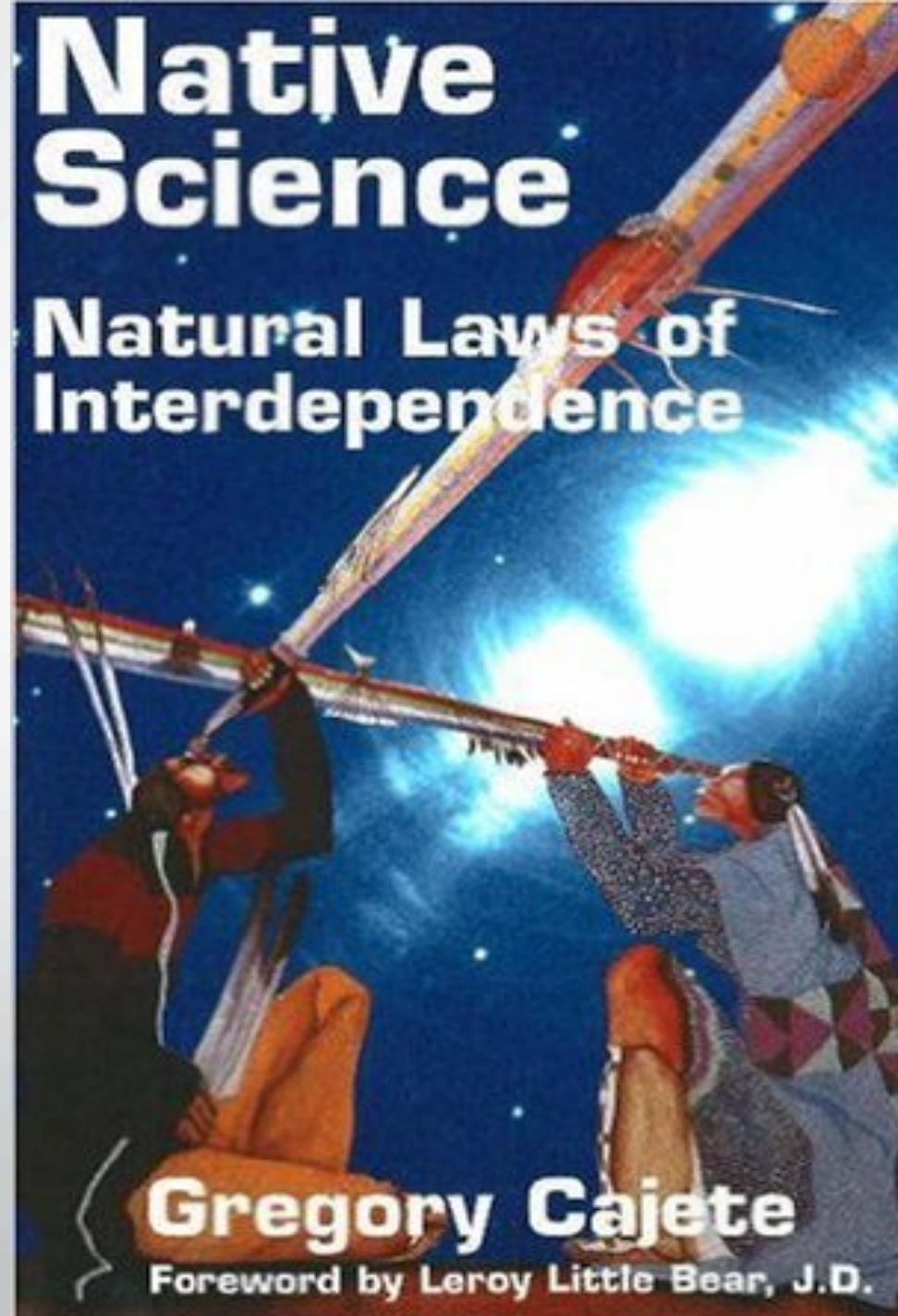
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Native Science Natural Laws of Interdependence

Gregory Cajete

Native Science stems from a deeply held philosophy of proper relationship with the natural world that is transferred through direct experience with a landscape, and through social and ceremonial situations that help members of the tribe learn the key relationships through participation and their “ella” as the Yupiaq would say. Methodological elements and tools of Native science that have traditionally facilitated such learning included:

- Observation
- Experiment
- Meaning
- Understanding
- Objectivity
- Unity
- Modeling
- Causality

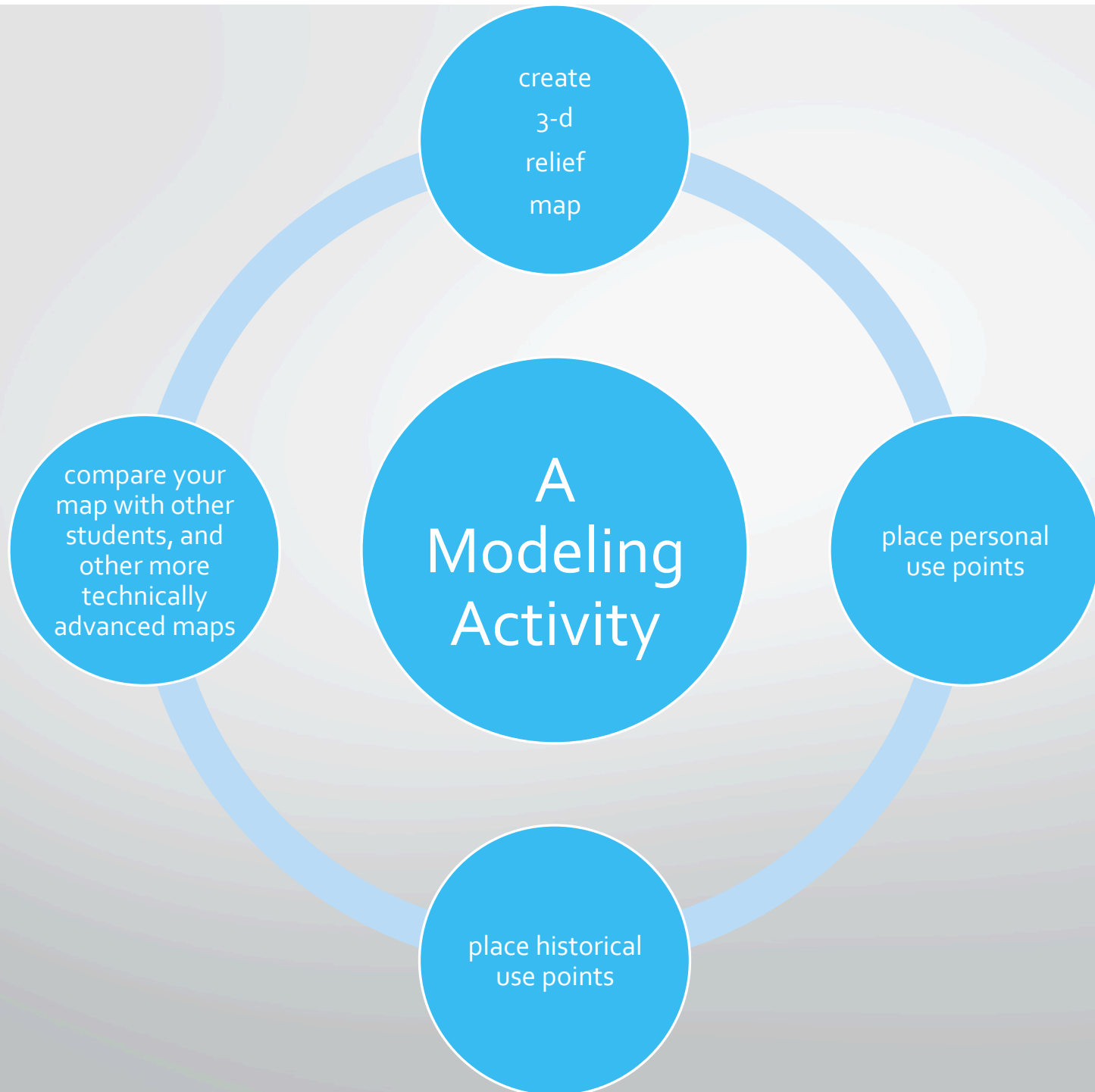


- Appropriate technology
- Spirit
- Interpretation
- Explanation
- Authority
- Place
- Initiation
- Cosmology
- Representations



- Humans
- Ceremony
- Elders
- Life
- Energy
- Dreams
- Visions
- Paths





Task One

As an instructor the options for using this lesson could be introductory or later within a mapping unit. Teams of students

- ✓ We will embark on a short hike near our school and when we return to class your team will make a 3 dimensional map(raise relief map) of the area.
- ✓ During the hike catalog as many observations as you can about the area that we are hiking over.
- ✓ Before we leave the classroom get together with your team and create a list of possible items you may want to look for to help you in your map creation.

A 3D model of a landscape, likely made of clay or similar material. It features a mountain with a snow-capped peak on the left, a winding river in the center, a small island on the right, a lake, and a desert area at the bottom. Labels in pinkish-red ink are visible: 'Hill' near the mountain, 'River' near the river, 'Island' near the island, 'Lake' near the lake, and 'Desert' near the desert area. The background is a plain, light-colored surface.

Task Two

When we get back to class your team needs to create a 3-dimensional model of the area we hiked. Use the observations you recorded to help in making your model.

Task Three

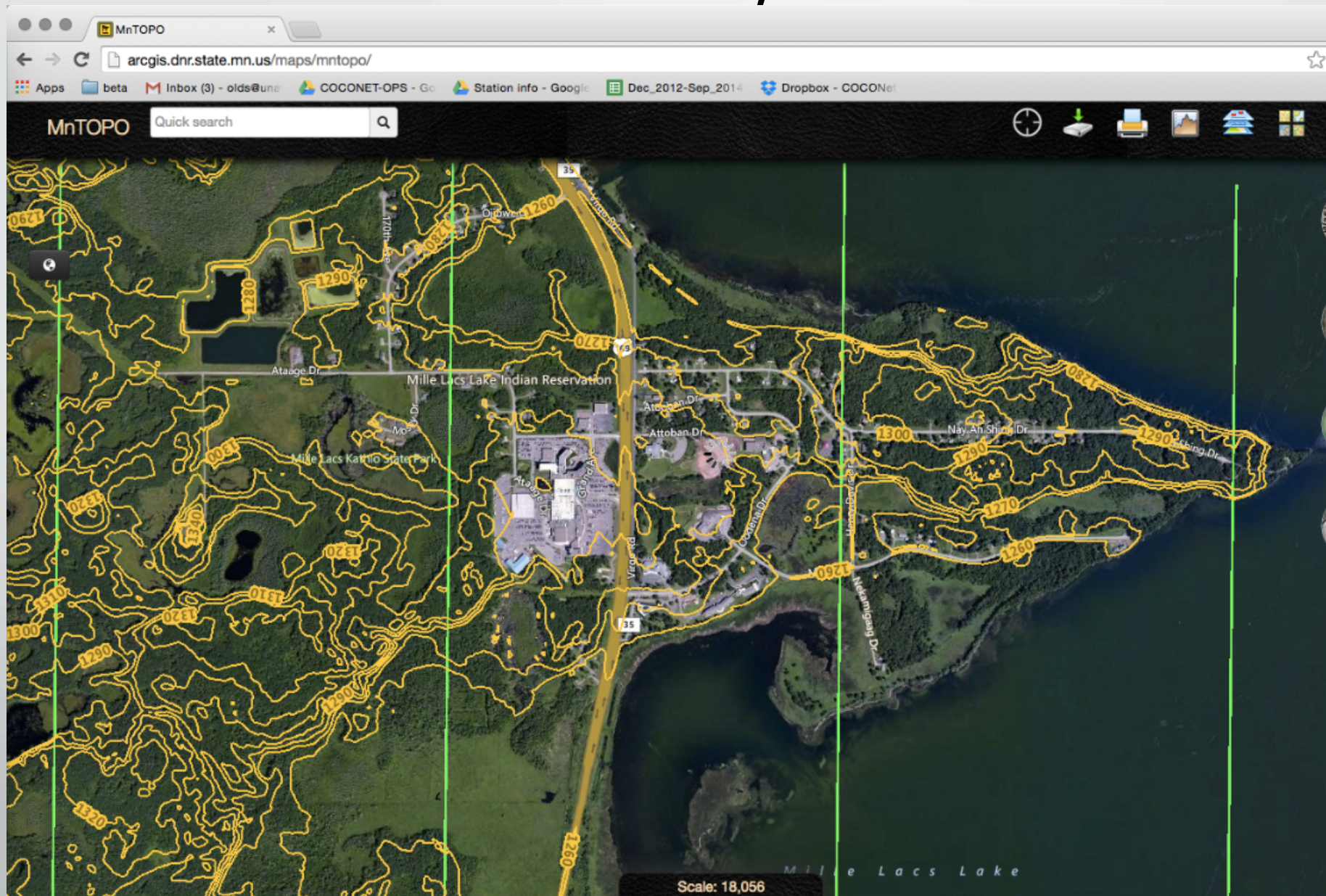
- ❖ As a team, make a list of how this land has been used in recent history.
- ❖ Now imagine we go back 400 years ago. Repeat.



Reflection

- Exchange your map/model with another group
- How are they similar? How do they differ?
- What might you add to your model/map if you did this again?
- What were challenges in doing this activity?

Mille Lacs Lake, MN





CCSS ELA – Literacy RST.6-8.7

Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g. flowchart, diagram, model graph or table)

MN State Science Standards

8th Grade Earth & Space

Strand 1. The Nature of Science and Engineering

Substrand 1. The Practice of Science

Standard 2. Scientific inquiry uses multiple interrelated processes to investigate questions, and propose explanations about the natural world

Code: 8.1.1.2.1 Use logical reasoning and imagination to develop descriptions, explanations, predictions, and models based on evidence

Substrand 3. Interaction among science and technology, engineering, mathematics, and society

Standard 4. Current and emerging technologies have enabled humans to develop and use models to understand and communicate how natural and designed systems work and interact

Code: 8.1.3.4.1 Use maps, satellite images, and other data sets to describe patterns and make predictions about local and global systems in Earth science contexts.

Strand 3 Earth and Space Sciences

Substrand 1. Earth Structure and Processes

Standard 2. Landforms are the result of the combination of constructive and destructive processes

Code: 8.3.1.2.2 Explain the role of weathering, erosion, and glacial activity in shaping Minnesota's current landscape.

Learning Outcomes

Benchmarks from MN Standards, 2009

- ☐ Determine and use appropriate safety procedures, tools, measurements, graphs and mathematical analyses to describe and investigate natural and designed systems in Earth and physical science contexts.
- ☐ Use logical reasoning and imagination to develop descriptions, explanations, predictions and models based on evidence.
- ☐ Understand that scientific knowledge is always changing as new technologies and information enhance observations and analysis of data. For example: Analyze how new telescopes have provided new information about the universe.