Place-Based Teaching and Learning

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We teach about Earth systems, processes, and history in real *places* that hold personal and cultural meanings and diverse kinds of relevance for our students. Their prior *senses of place* can either help or impede their learning.

Participants in this session will explore the use of place as context and theme for relevant, inclusive, and trans-disciplinary place-based teaching; and the leverage of sense of place as motivation for learning.

Most examples presented here are from my work in the American Southwest, but the same basic ideas can be used in any place.

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Recall a place that is both *intellectually* and *personally* very important to you.

The place can be as small or as large (i.e., a region) as you wish.

Brainstorm a list of

- Everything you can think of that characterizes or is associated with that place; and
- All the ways you know about and interact with that place.

Then, ***sketch*** a map or other representation of that place, incorporating as many of the things from your list as you can. Label what you sketch.

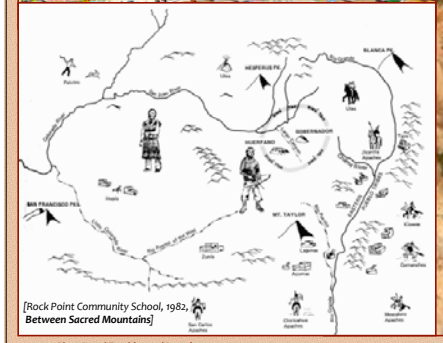
Be prepared to ***share*** your sketch with the rest of the group in a few minutes.

We teach Earth, environmental, and ecological sciences in and about *places: localities imbued with meaning through human experience* [Relph 1976, Tuan 1977].

Grand Canyon, Arizona

Places populate the cultural landscape, just as landforms and biota make up the physical landscape.

*[Bloodgood, ca. 1950, **Pic-Tour Map of Arizona**]*

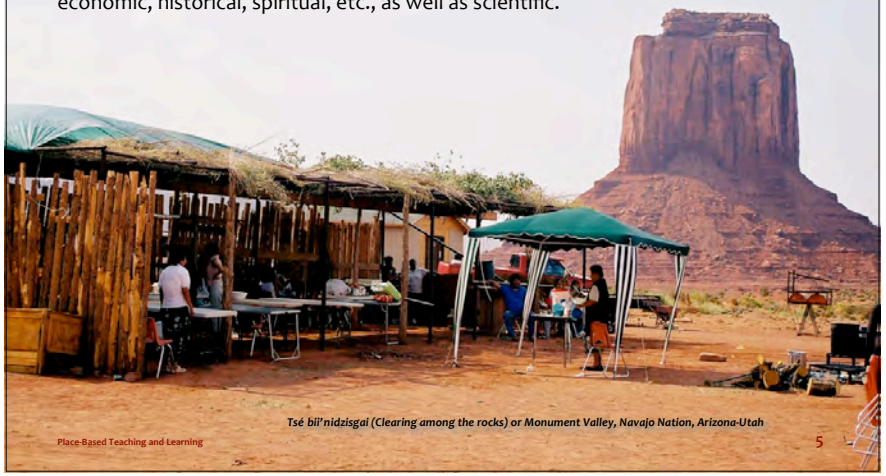


*[Rock Point Community School, 1982, **Between Sacred Mountains**]*

[NASA]

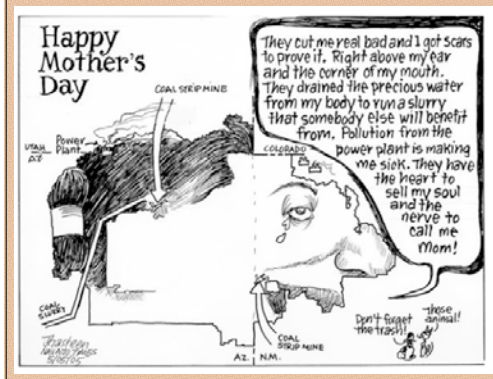
Places hold diverse meanings for different people and cultures.

Place meanings can be aesthetic, ceremonial, economic, historical, spiritual, etc., as well as scientific.



Tsé bii' nidzisgai (Clearing among the rocks) or Monument Valley, Navajo Nation, Arizona-Utah

People and groups develop emotional attachments to meaningful places.

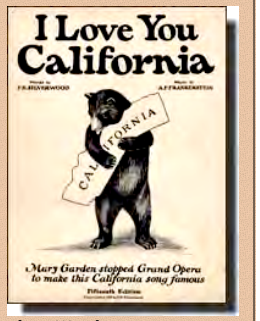


*[Jack Ahasteen, 2005, **The Navajo Times**]*

[Treehugger Films]

Heber, Arizona

Miami, Arizona



[Sunsetbld.com]

The sense of place encapsulates our connection to places.

Sense of place is the set of all meanings and attachments a person or a group invests in a place [Brandenburg & Carroll 1995, Williams & Stewart 1998]

Round Rock, Navajo Nation, Arizona

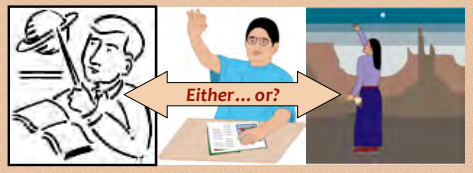
Indigenous and historically long-rooted communities possess rich, culturally-mediated senses of place
[e.g., Native Americans and Mexican Americans in the Southwest USA: Cajete 2000, Alarcón 2002]

In spite of deep place attachment and familiarity with Earth systems…

they have long been underrepresented in geoscience and other natural sciences
[e.g., Riggs & Semken 2001, Huntoon & Lane 2007]

Does teaching that contradicts or minimizes their senses of place help deter these students from scientific study and careers?

[Kawagley et al. 1999, Aikenhead & Jegede 1999, Riggs 2005, Semken 2005]



Globalization, careerism, standards-based teaching, entertainment media, pop culture, etc., divert people from meaningful engagement with places.

… with consequences [Relph 1976]

Misunderstanding, fear, avoidance of nature [Sobel 1996]

Possible harm to physical and mental health [Louv 2005]

Obliviousness to the aesthetic, cultural, ecological value of the local [e.g., Orr 1992]

Acquiescence in environmental and social degradation of surroundings [Orr 1992, Meyrowitz 1985]

Disinterest in geoscience and other natural science studies and careers? [Levine et al. 2007]

Place offers context *and* theme for meaningful teaching and learning.

Wisdom sits in places… You must remember everything about them.
You must learn their names.
You must remember what happened at them long ago.
You must think about it and keep thinking about it.
Dudley Patterson, late Ndee (Western Apache) elder, in *Wisdom Sits in Places* (Basso 1996)

[Experiences in places are] profoundly pedagogical [in] nature.
Gruenewald 2003, *Foundations of Place-Conscious Education*

Place supplies the context; disciplines the tools.
Ault 2008, *Achieving Querencia*

Goldfield and Superstition Mountains, Sonoran Desert, Arizona

In place-based teaching, sense of place defines the curriculum.
[Elder 1998, Smith 2002, Woodhouse & Knapp 2002, Gruenewald 2003, Sobel 2004, Semken 2005, Lim & Calabrese Barton 2006, Gruenewald & Smith 2008, Ault 2008]

Local: focused on surrounding natural and cultural environments
Experiential: inquiry in field and lab with local features and materials
Trans-disciplinary: synthesizes geology, geography, climatology, hydrology, ecology, anthropology, history, art
Cross-cultural (sometimes multilingual): Incorporates or acknowledges different cultural perspectives on places and processes under study
Promotes environmental and cultural sustainability

[Grotzinger et al. 2007]

Authentically place-based teaching is experiential and trans-disciplinary.

It requires access to the outdoors and the community, and enough time for synthesis of ideas.

… Classical natural history is a model for PB science [Gruenewald 2003].

Places are (by definition) human as well as natural.

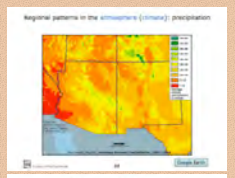
… Infuse scientific *and* humanistic meanings and inquiry into the curriculum.

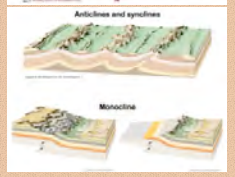
Students of all backgrounds must be empowered to find meanings and form attachments.

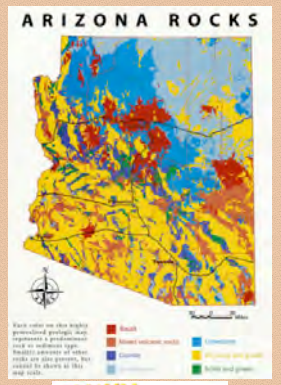
… Nobody should be marginalized by the choice of place.

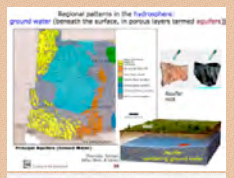
Enrichment of the senses of place of students and teachers should be a learning outcome along with enriched content knowledge and skills. [Semken 2005, Semken & Butler Freeman 2008]

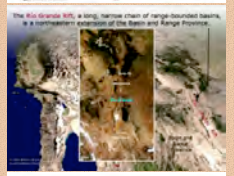
Place-based Earth science teaching and learning:
leveraging sense of place by focusing on local or regional Earth system science content

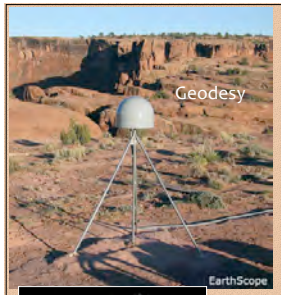




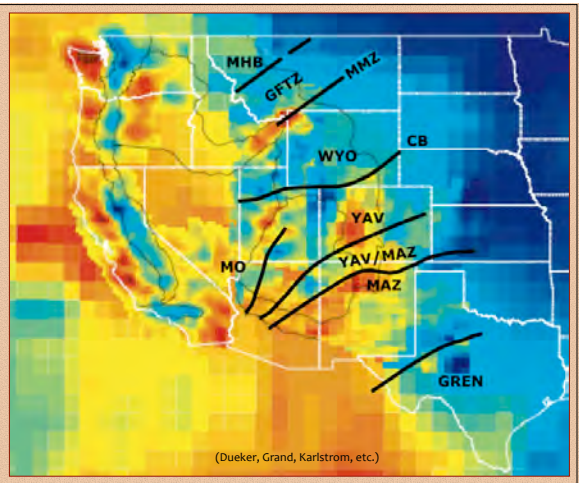






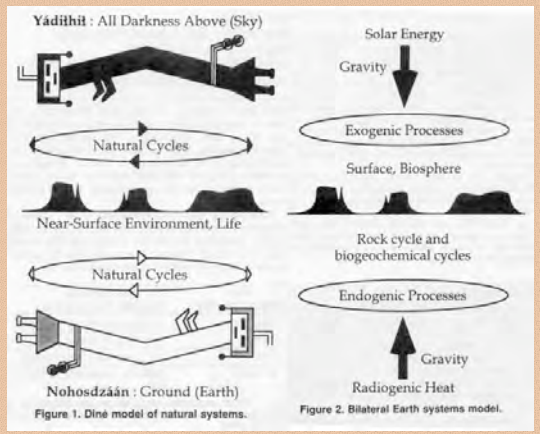


earth scope



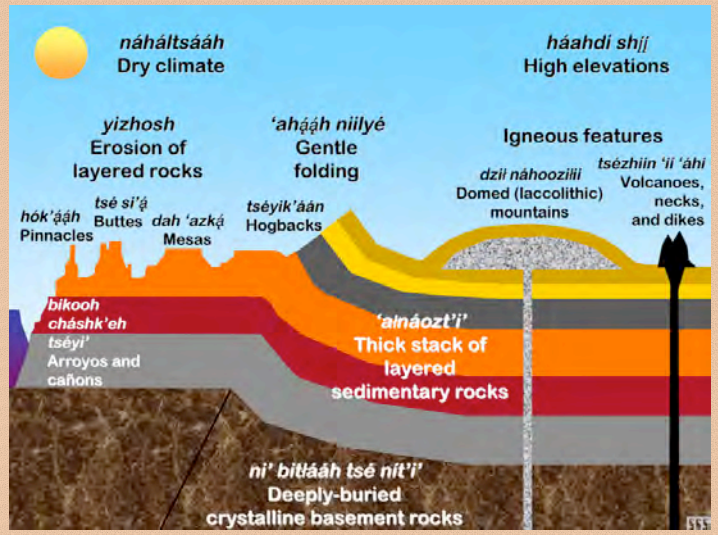
…including the deep Earth
beneath the landscape

Place-based Earth science teaching and learning:
leveraging sense of place by integrating culturally relevant ways of understanding the Earth

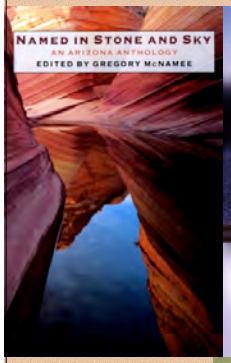


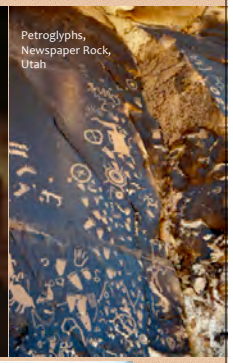
[Semken & Morgan 1997]

Place-based Earth science teaching and learning:
leveraging sense of place by using locally relevant names for places and processes



Place-based Earth science teaching and learning: leveraging sense of place by integrating scientific and humanistic meanings and inquiry

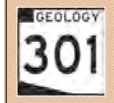


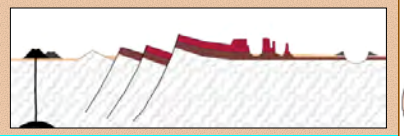

Petroglyphs, Newspaper Rock, Utah

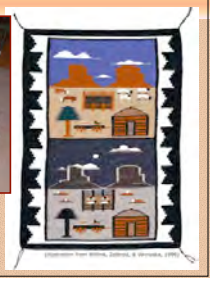
[Chihuly, 2009, *The Nature of Glass*, at Desert Botanical Garden, Phoenix]

[James, n.d., Navajo storm pattern rug]

Place-based Earth science teaching and learning: leveraging sense of place by using place-conscious design elements







Place-based Earth science teaching and learning: leveraging sense of place by teaching in the field and in the community

Tsé bit'a'í (Rock with wings) or Ship Rock, Navajo Nation, New Mexico

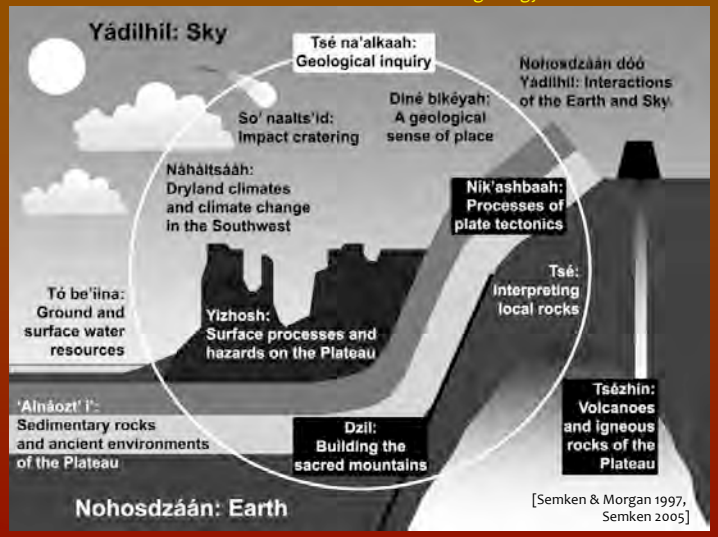
Superior, Arizona

Place-based Earth science teaching and learning: leveraging sense of place by engaging with current local sustainability concerns

[New York Times, 2007]

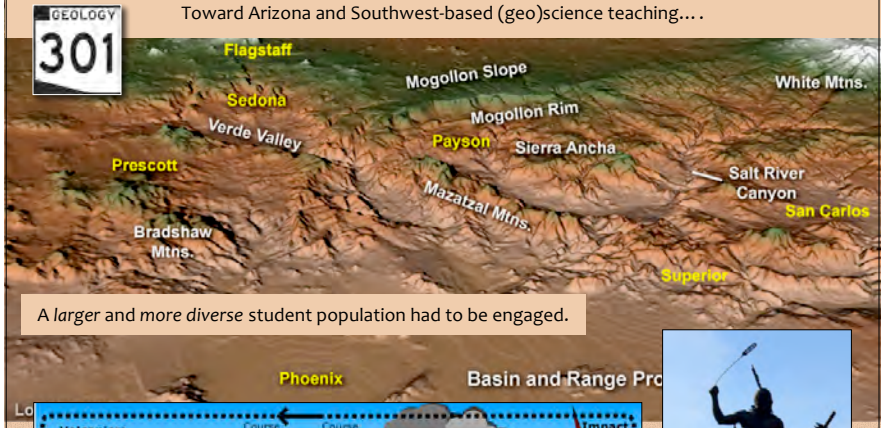
Tsé na'alkaah 101: Indigenous place-based geology

Bilingual; organized according to concepts of Diné (Navajo) ethnogeology and attributes of Colorado Plateau geology

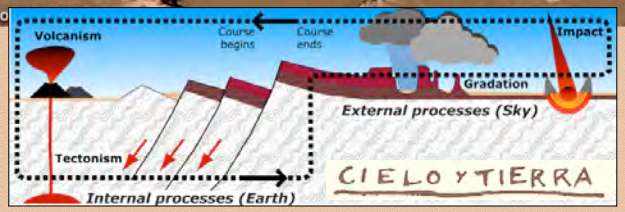


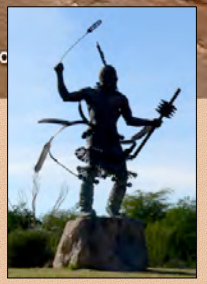
[Semken & Morgan 1997, Semken 2005]

Toward Arizona and Southwest-based (geo)science teaching…



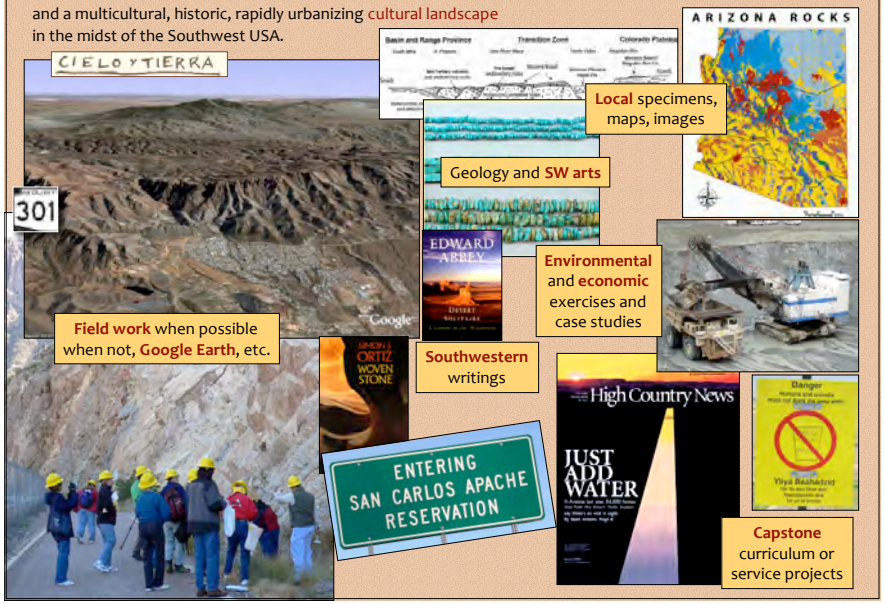
A *larger* and *more diverse* student population had to be engaged.





San Carlos, Arizona

Arizona: not presented as a politically defined state,
but a complexly evolved and ruggedly beautiful desert-mountain physical landscape
and a multicultural, historic, rapidly urbanizing cultural landscape
in the midst of the Southwest USA.



Local specimens, maps, images

Geology and **SW arts**

Environmental and **economic** exercises and case studies

Field work when possible when not, **Google Earth**, etc.

Southwestern writings

Capstone curriculum or service projects

How would **you** plan and teach a place-based course?

Choose a conventional, introductory ***undergraduate science course*** that you have taught, taken, or otherwise have familiarity with; e.g.,

- Physical or historical geology
- Physical geography
- Earth system science
- Oceanography, etc.

Identify a ***place*** (or ***region***) in which you would like to situate this course.
Think about the ***meaningful attributes*** of this place (physical and cultural).

Devise a ***simple course outline*** that:

- presents the most important ideas of your subject,
- authentically evokes the place or region, and
- is relevant and useful to those who live in, visit, know, love, or otherwise find meaning in that place.

Sense of place has been well-characterized

in environmental psychology and cultural geography.

[Brandenburg & Carroll 1995, Stedman 2003a]

Place satisfaction
[Stedman 2003b]

Place meaning*
Cognitive, affective;
Environmentally, socially constructed
[Young 1999, Stedman 2003a]

Place attachment
Affective

[Relph 1976, Williams & Roggenbuck 1989, Shamai 1991, Williams & Vaske 2003]

Place identity*
Emotional attachment:
place as a repository for emotions and relationships

Place dependence*
Functional attachment:
capacity of a place to support goals or activities

*Validated **psychometric instruments** exist for these components, allowing for their characterization and measurement in different groups

Quantitative assessment of place-based learning

Responses on Likert scale = place attachment and meaning scores

Place Attachment Inventory (PAI)

[Williams & Vaske 2003, Semken & Butler Freeman 2008]

This place is a part of me.
This place is the best place for what I like to do.
This place is very special to me.
No other place can compare to this place.
I identify strongly with this place.
I get more satisfaction out of being at this place than at any other.
I am very attached to this place.
Doing what I do at this place is more important to me than doing it in any other place.
Being at this place says a lot about who I am.
I wouldn't substitute any area for doing the types of things I do at this place.
This place means a lot to me.
The things I do at this place I would enjoy doing just as much at a similar site (reverse scored).

Also, content knowledge instrument:
Geoscience Content Inventory (GCI) [Libarkin & Anderson 2005]

Young's Place Meaning Survey (YPMS)

[Young 1999, Semken & Butler Freeman 2008]

Ecologically important	Exotic
Important to preserve	Remote
Educational	Unspoiled
Unique	Authentic
Scientifically important	Adventurous
Fragile	Unusual
Interesting	Important for Native culture
A privilege to visit	Historical
A privilege to live here	Ancient
Tranquil	Spiritually valuable
Scenic	Overdeveloped
Relaxing	Dangerous
Wilderness	Crowded
Beautiful	Threatened

Mixed-methods research on sense of place and place-based teaching for development, practice, and authentic assessment

- *Psychometric instruments* to characterize SoP and measure pre-post changes
- *Ethnography:* Direct behavioral observations in classroom and field, and student interviews. Verbal, textual, content analyses and *ethograms* applied to data.

- Analysis of student-produced artifacts such as *concept sketches* [Johnson & Reynolds 2005] and essays

- Cultural validation of model place-based curricula
- Significant gain in SoP and content knowledge with place-based teaching
- Correlation of SoP for Southwest with experience in places but not with student ethnicity
- Positive student and pre-service teacher response to place-based teaching:
  enhanced place attachment,
  science comprehension,
  implementation in K-12 classes

Semken (2005) *JGE* 53 149-157
Semken & Butler Freeman (2007) *Proc. NARST*
Semken & Butler Freeman (2008) *Sci. Ed.* 92 1042-1057
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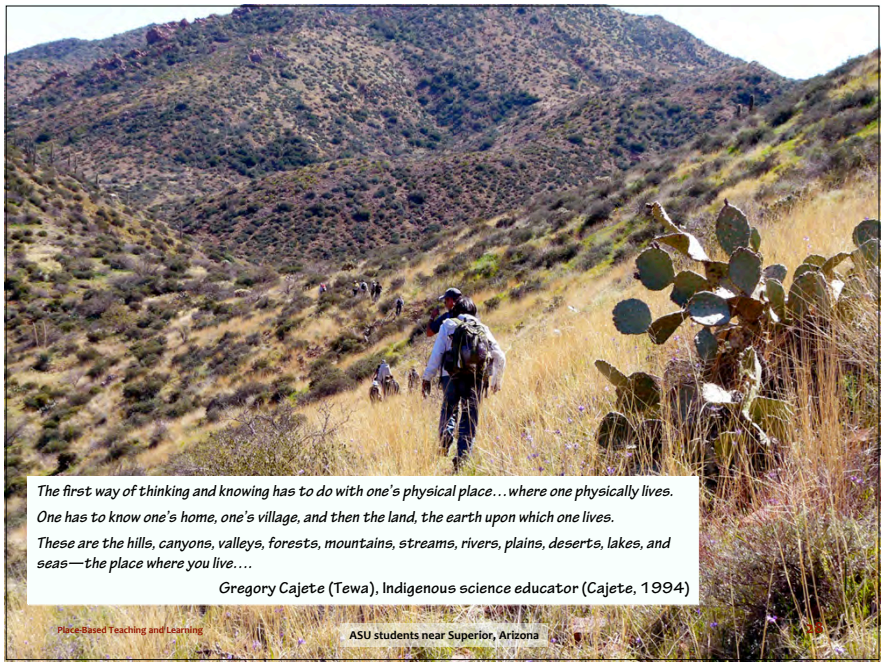
Ward, Semken, Libarkin (NSF GeoEd Program)



The first way of thinking and knowing has to do with one's physical place…where one physically lives.
One has to know one's home, one's village, and then the land, the earth upon which one lives.
These are the hills, canyons, valleys, forests, mountains, streams, rivers, plains, deserts, lakes, and seas—the place where you live….
Gregory Cajete (Tewa), Indigenous science educator (Cajete, 1994)

ASU students near Superior, Arizona

Place-Based Teaching and Learning

Steve Semken, Arizona State University School of Earth and Space Exploration • July 2010

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