

Strategies for Culturally-Relevant Education about a Changing Ocean

Marilyn Sigman and Nora Deans



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People, Ocean, and Climate

Do you believe in climate change?

- Do you believe it's happening?
- Do you believe that human activities are causing climate change?
- Do you believe that most scientists agree that it's happening?



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National Poll Results

- October, 2009: 57% said there was solid evidence of warming (down from 77% in 2006 and 71% in 2008)
- October, 2009: 36% said humans were the cause of climate change (down from 47% in 2006 and 2008)
- December, 2009: 36% said that scientists were generally in agreement that the world was warming (down from 56% in May, 2009)



Climate Change Beliefs

“Six Americas”

- The Alarmed (18%)
- The Concerned (33%)
- The Cautious (19%)
- The Doubtful (11%)
- The Dismissive (7%)



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A Spectrum of Attitudes toward the Certainty of Science and the Scientific Method

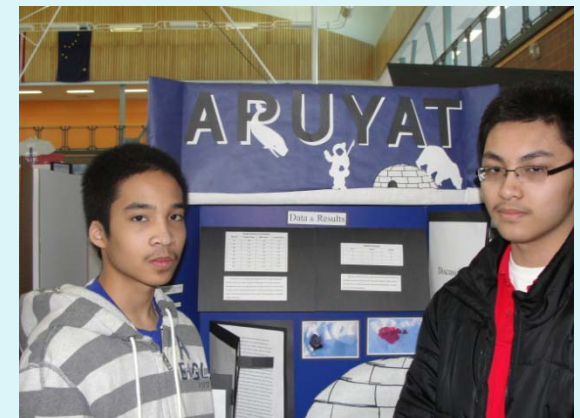


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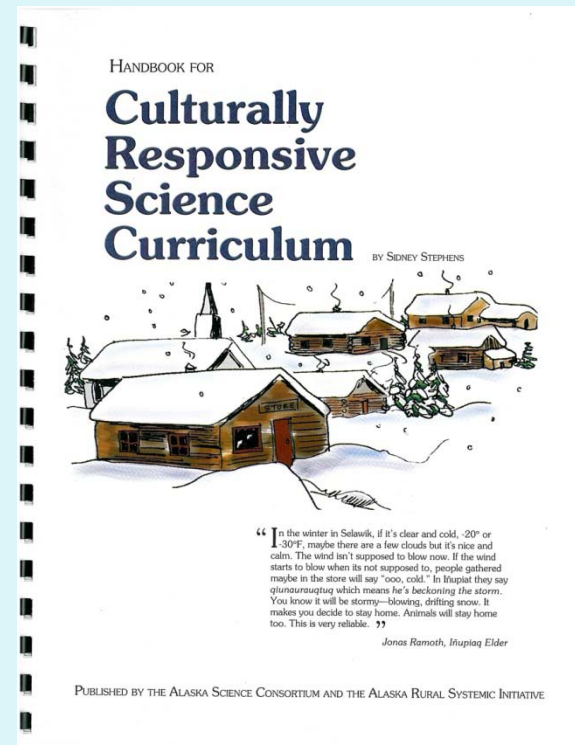
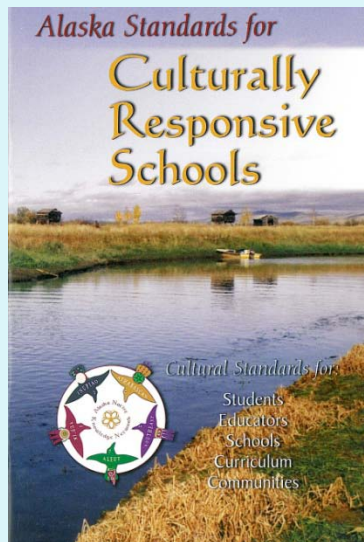


Cultural Relevance

Cultural Responsiveness



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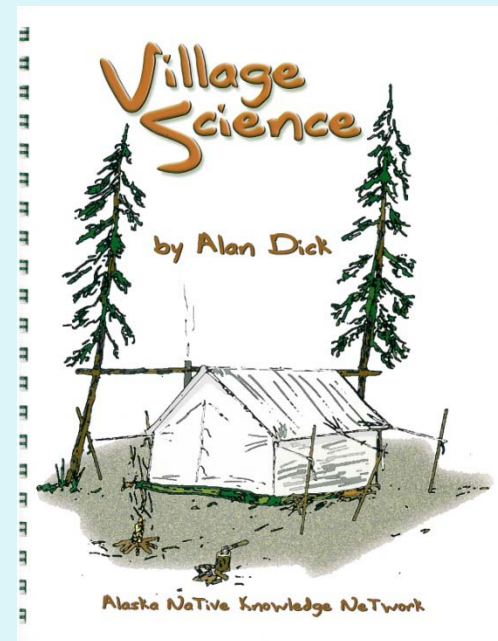


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Alaska Native Cultures Indigenous Cultures



“Alaska Bush” culture



What is cultural relevance and/or responsiveness?

- In what educational contexts is it important?
- Relevant /responsive to which culture(s) or sub-culture(s)?
- Who decides relevance?
- How can relevance and responsiveness be measured?
- Are there limits to cultural relevance?



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Ways of Knowing

- Western science
- Place-based Knowledge
 - Traditional Knowledge or Indigenous Knowledge and Wisdom
 - Local Knowledge
 - Sense of Place (over a long-time period)

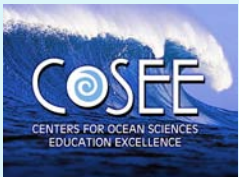
“Information, understanding and wisdom accumulated over time based on experience and often shared within a group or community”



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Science as a “Way of Knowing”

- Requires a rigorous method of inquiry and standards of validity that are consensus-based.
- It provides a way to marshal evidence of environmental change and the rate of change.
- It provide conceptual understandings about complex and interrelated processes.
- It does not “prove “ anything or find absolute truth or 100% certainty.



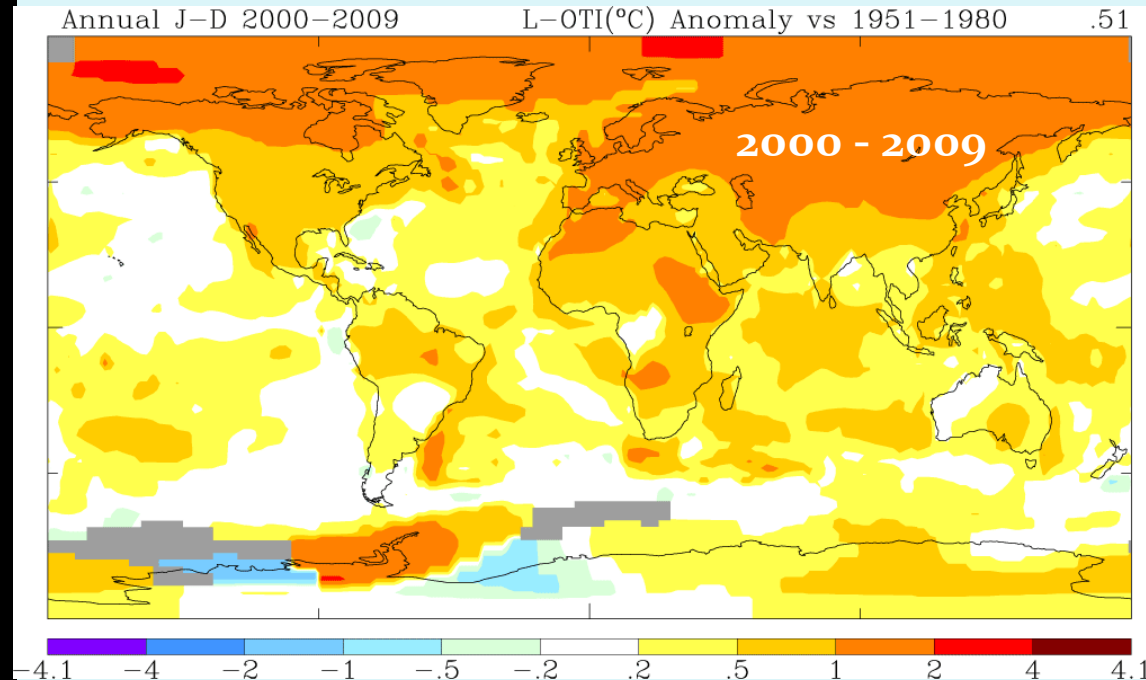
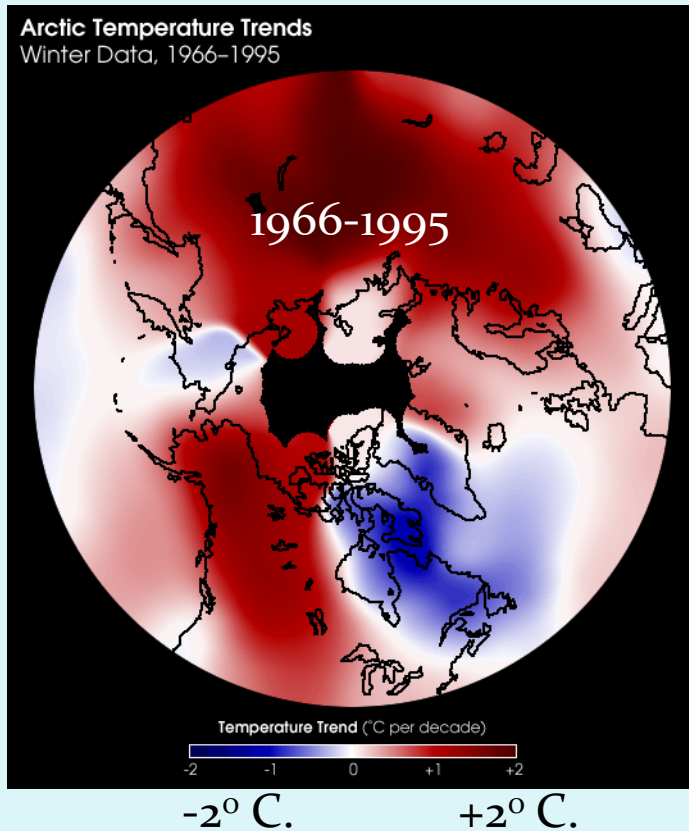
Place-based Knowledge

- Is personal and often anecdotal or qualitative
- Its validity is in its lived experience.
- Its authority is determined by the community that regards certain people as wise.
- It is often shared through story-telling.
- For indigenous people, it is inter-generational and a worldview that extends into spiritual and ethical realms.

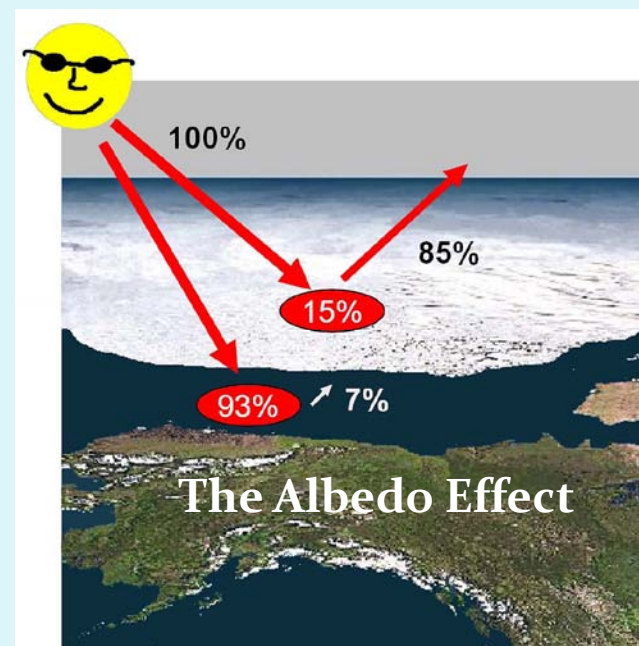
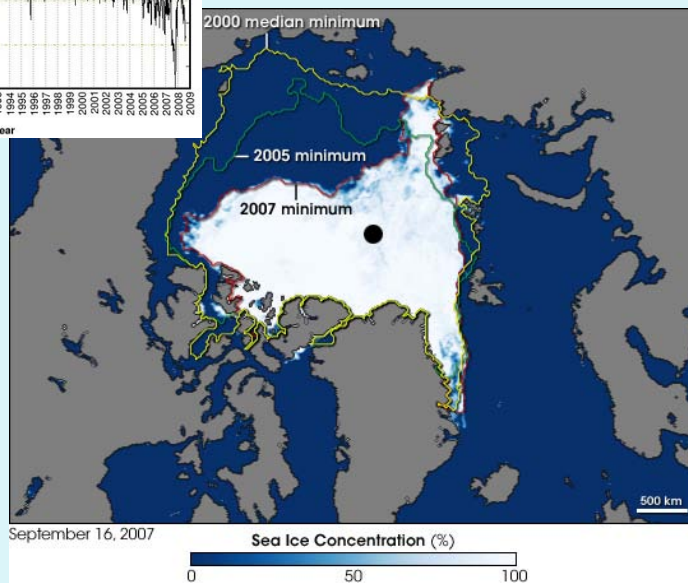
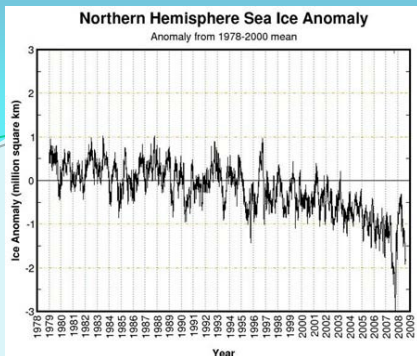


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The Arctic is Warming Faster than the Rest of the Globe



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**Arctic Sea Ice –
Shrinking, Thinner,
and Younger**



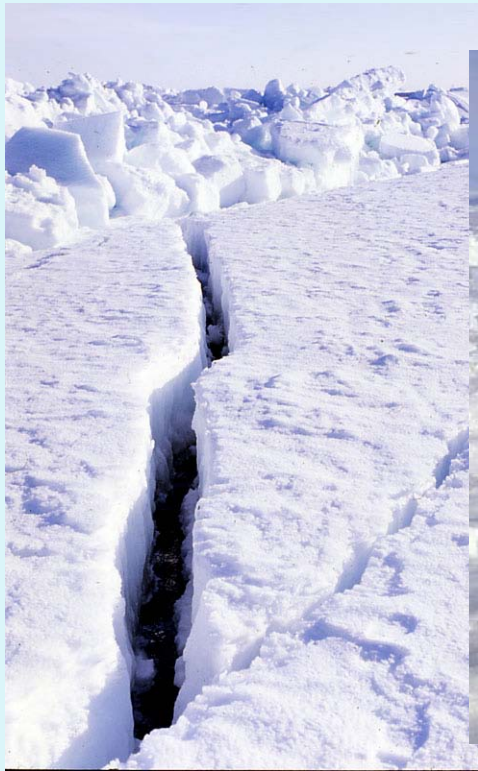
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Shrinking Sea Ice Means Less Physical Habitat for Marine Mammals



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Changing Ice Conditions Makes Subsistence Hunting More Difficult or Dangerous

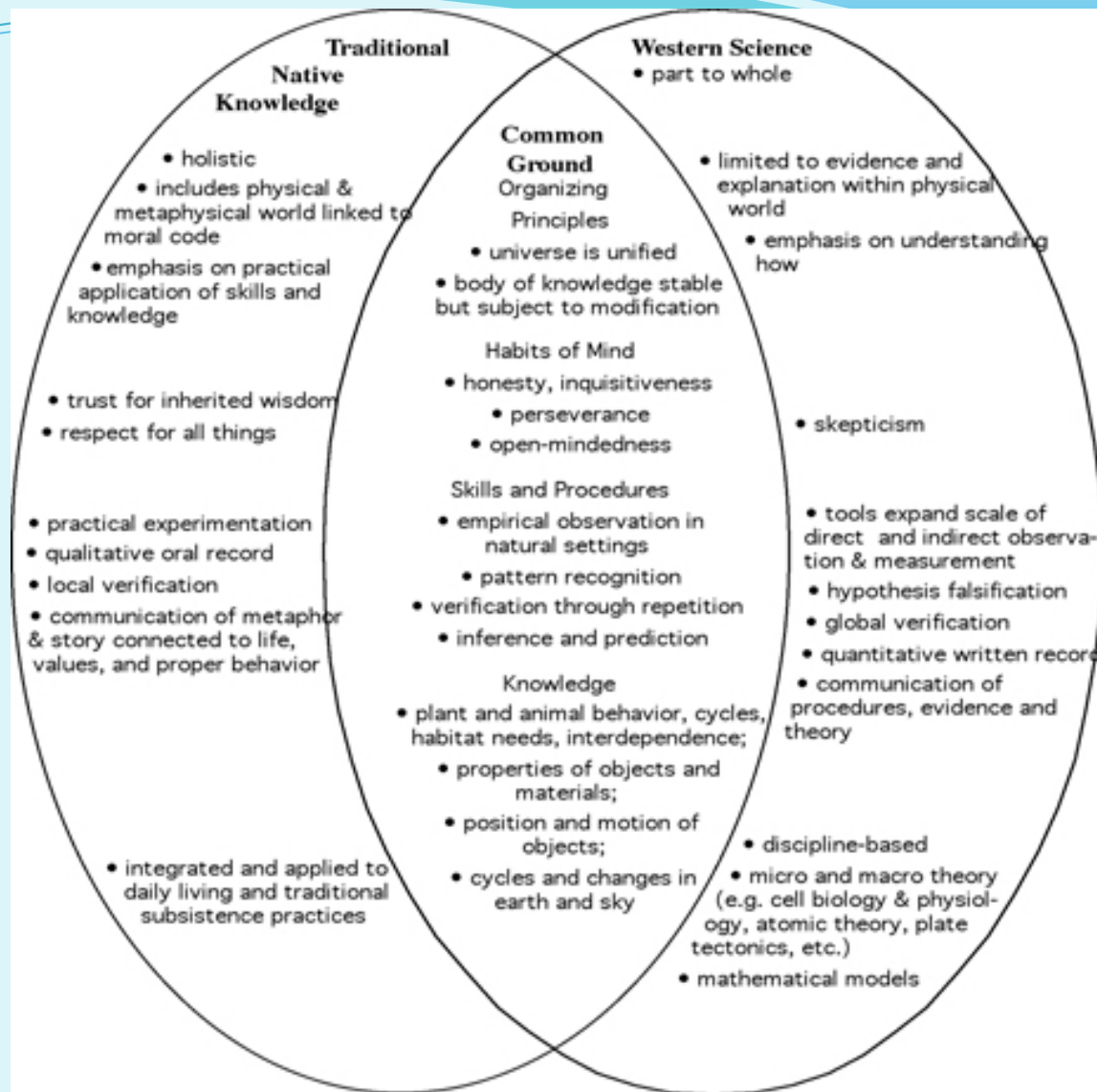


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Faces of Climate Change



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Climate Change

Western Science

- Climate science requires systems thinking
- Gathers observations over a range of scales – study site to global
- Has difficulty integrating knowledge across disciplines

Alaska Native Knowledge

- Is holistic
- Gathers observations locally over long periods of times.
- Knowledge of interest (e.g, where to find marine mammals) can integrate multiple variables.



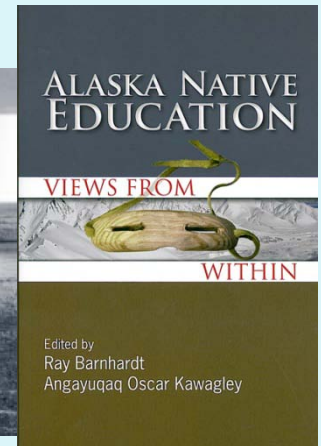
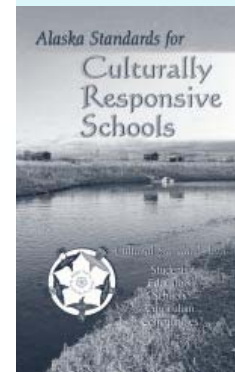
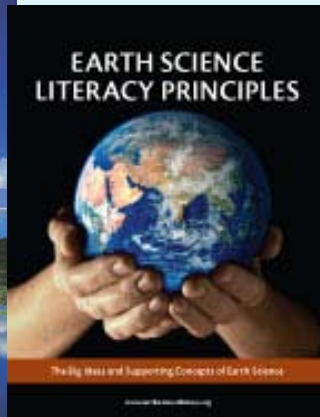
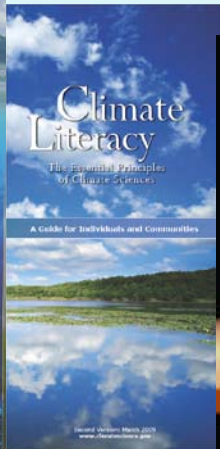
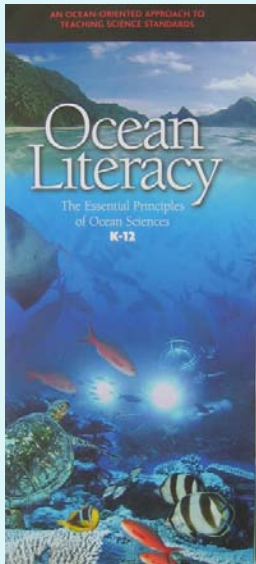
Alaska Strategies for Integrating Scientific and Place-based Knowledge

- Integration of both into the curriculum, lesson plans, and teacher professional development
- Sustained scientist-teacher partnerships
- Science fairs with requirements for cultural or community relevance
- Facilitation of scientist-community partnerships and learning cycles
- Emphasis on storytelling

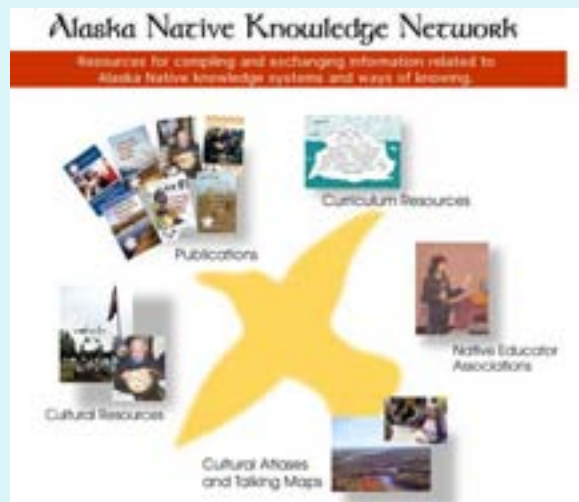


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Integration into K-12 Curriculum



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<http://ankn.uaf.edu>



Lessons & Units

A database of lessons and units [searchable](#) by content and cultural standards, cultural region and grade level. More units will be available soon. You can use Acrobat Reader to look at the PDF version of the [Cover Sheet for the Units](#) and [Self-Assessment for Cultural Standards in Practice](#).

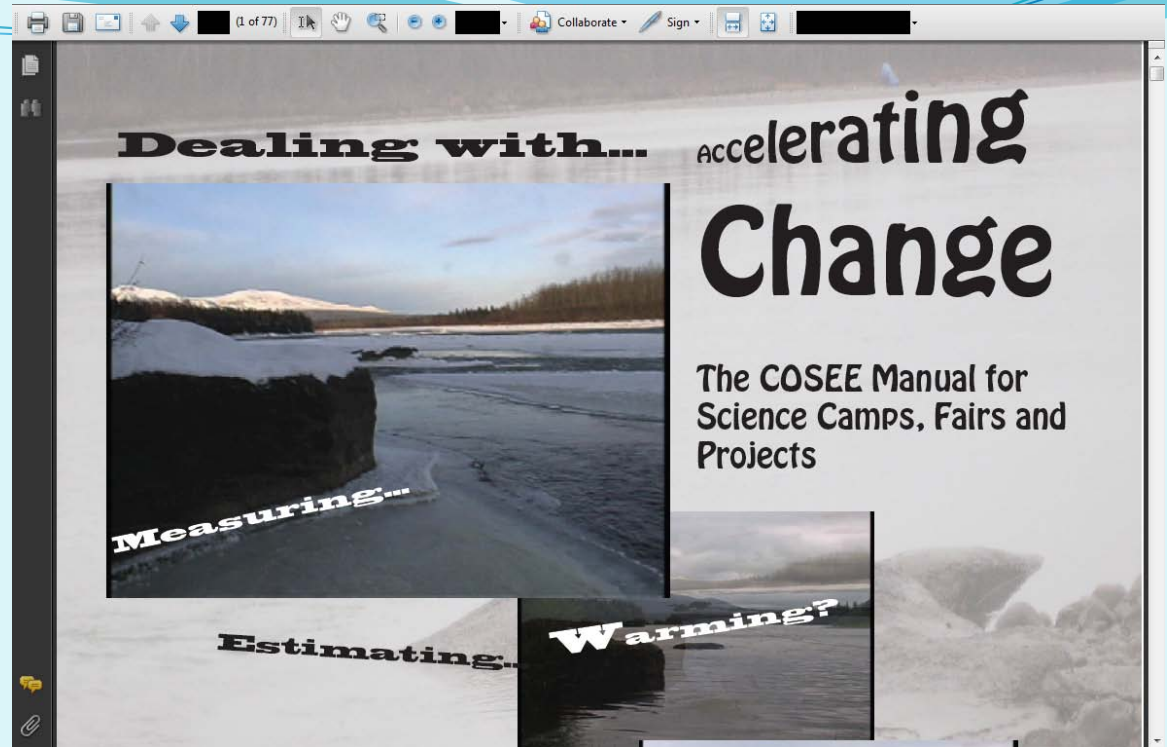
Here are the units available now:

Whouy Sze Kuinalth "Teaching Our Many Grandchildren"	Tauhna Cauyalitahtug (To Make a Drum)	Math Story Problems
St. Lawrence Island Rain Parka	Winds and Weather	Willow
Driftwood	Snowshoes	Moose
Plants of the Tundra	Animal Classification for Yup'ik Region	Rabbit Snaring
The Right Tool for the Job Fishing Tools and Technology	Blackfish	Family Tree
Medicinal Plants of the Kodiak Alutiig Archipelago	Beaver in Interior Alaska	Digging and Preparing Spruce Roots
Moose in Interior Alaska	Birds Around the Village	Dog Salmon



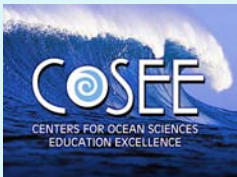
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**Ocean Science
Fairs:**
Focus on ocean,
watersheds, and
climate change



A Manual with 200+ Project Ideas
"How-to" Videos on
<http://ankn.uaf.edu/Curriculum/COSEE/index.html>

On-site Support



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Local winners compete in the State Science Fair

Team/Individual
Student(s) Name(s) _____

Name of Project _____

**Scoring
Experiment
COSEE Science Fair**

Total Score _____

Scientific Process	A question was asked, but not well pursued. This is more of a library project than a hands-on science project.	Clear hypothesis, data gathering and performance of experiment or observation. The project involved hands-on activity, organized thinking and good observation skills.	Exceptionally well done with insightful performance and conclusions. The student was immersed in the project, trying several methods, even unsuccessful ones. The student thoroughly explored the original question.
Data	Data is somewhat disorganized. Difficult for reader to understand the results. Data was collected, but not enough for conclusive results.	The data is organized and tells the reader what happened. Enough data was collected to make adequate conclusions.	The data is overtly organized and displayed in several ways including graphs and charts. There was enough data for conclusive results.

Two Types of Judges

Two Types of Scoring Rubrics

Team/Individual
Student(s) Name(s) _____

Name of Project _____

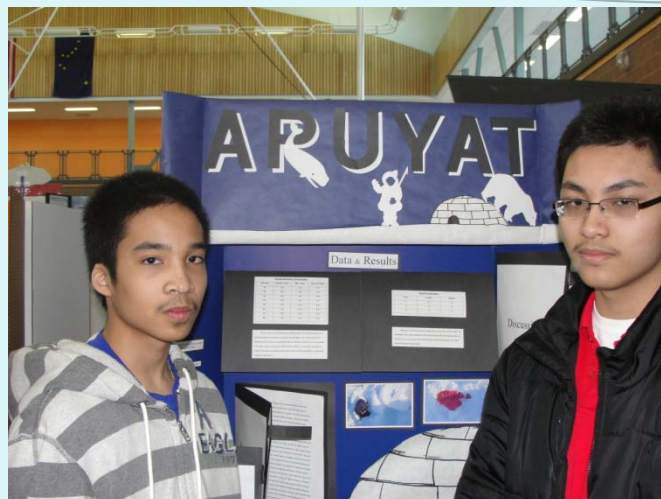
**COSEE State
Science Fair
Scoring- Elders**

Total Score _____

Cultural Values	The presentation by the students and display of his/her project maintains the cultural values of his/her area.	Needs more work 1	Good 3	Excellent 5
Quality project	The student's work is well done. The project is organized and attractive. It shows good thought. The presentation is clear and confident. The discovery process is evident as used in village life.	Needs more work 1	Good 3	Excellent 5
	The project is a study of	Needs more	Good	Excellent



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Ice Cellar Project

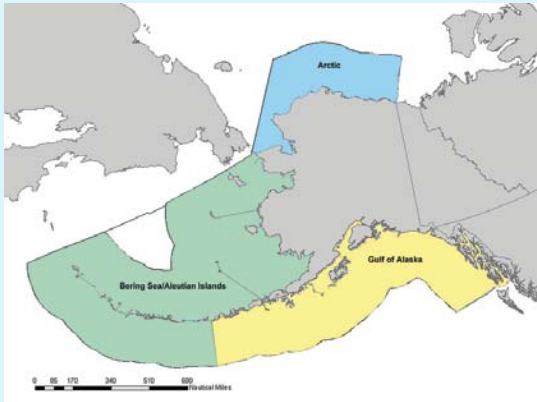


Anchorage Settling Pond Project



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Professional Development



**Curriculum
Development for
Large Marine Ecosystems**



**Salmon-in-the-Classroom
Learning Community**



**Scientist Involvement
and Partnerships**

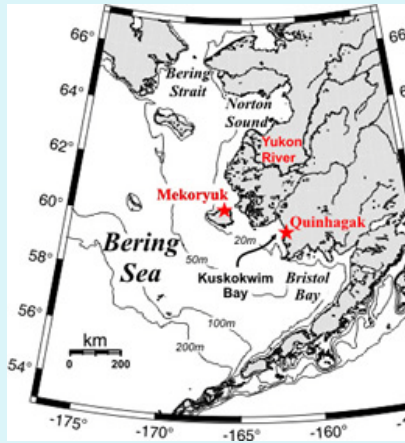


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Sustained Teacher-Scientist Partnerships



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Quinhagak Students & The Bering Sea Drifter Study



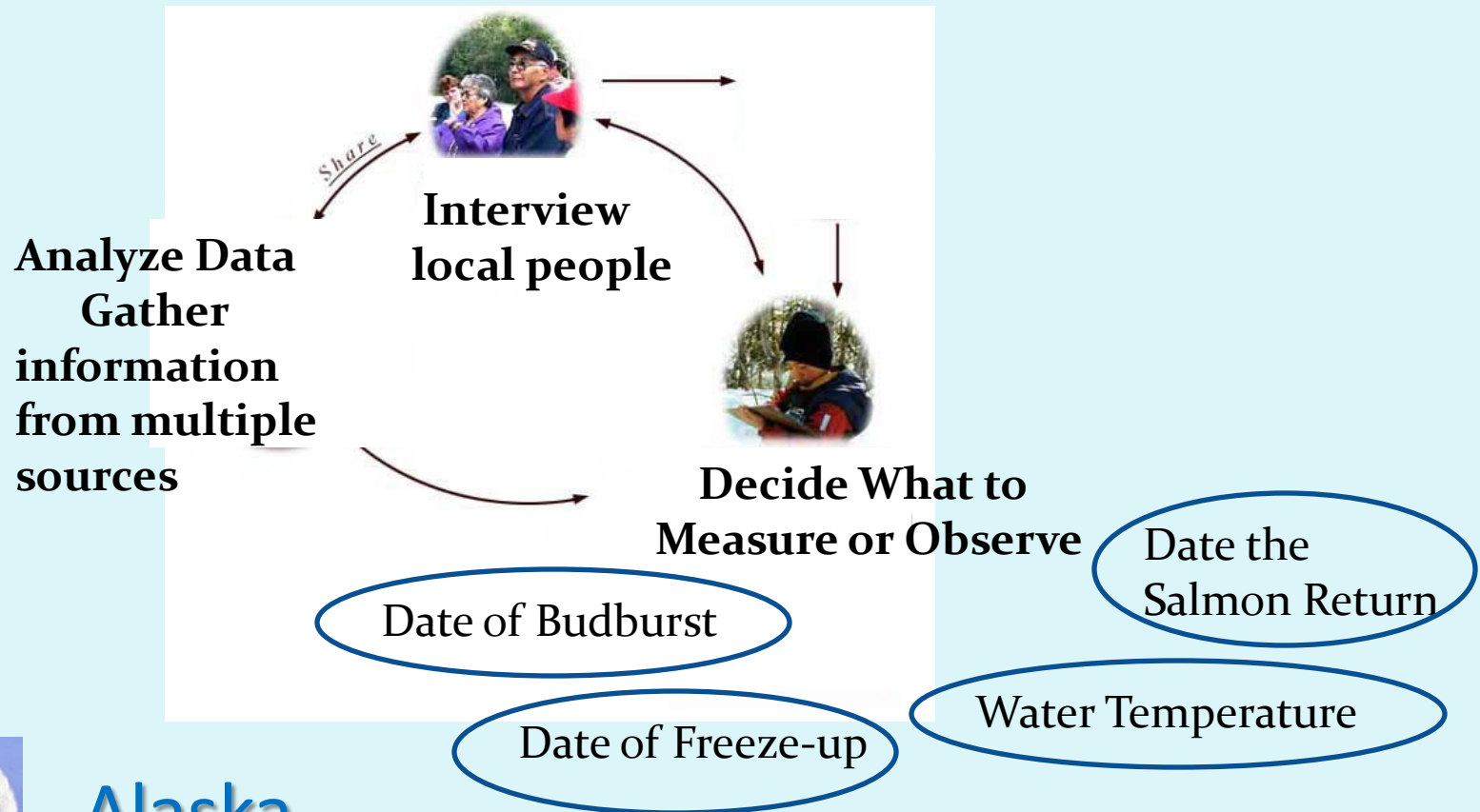
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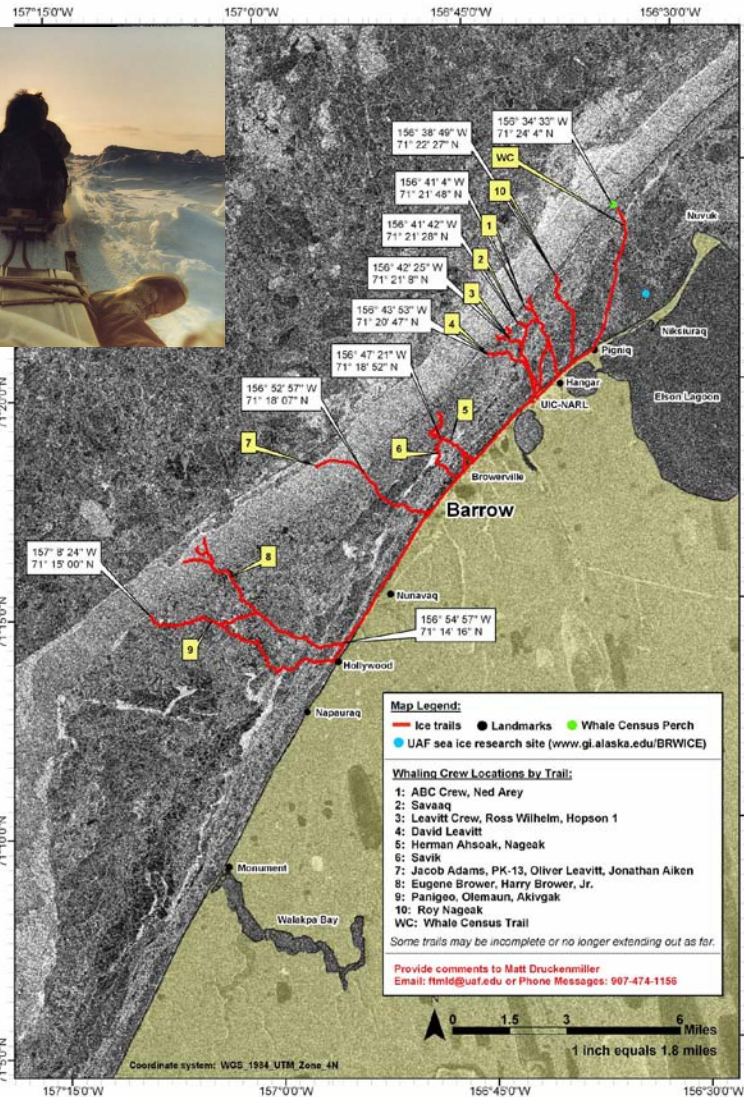
Science & Culture Camps



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School & Community Monitoring Projects

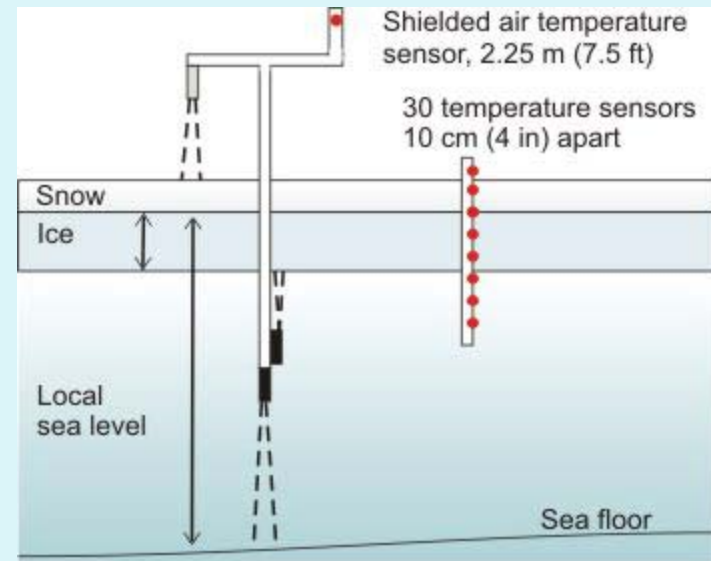




Seasonal Ice Zone Observing Network

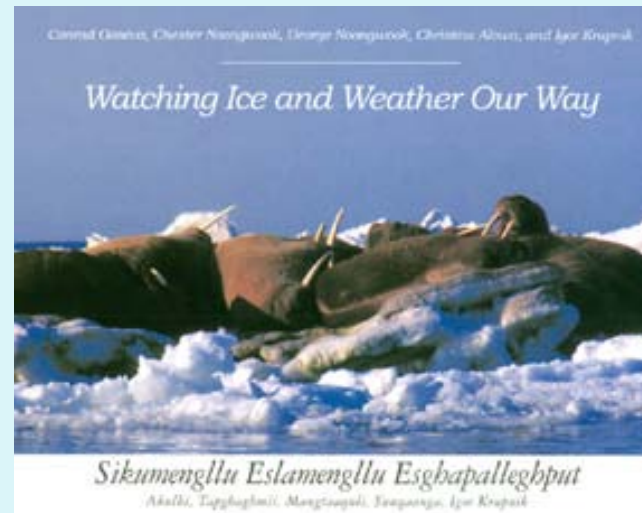
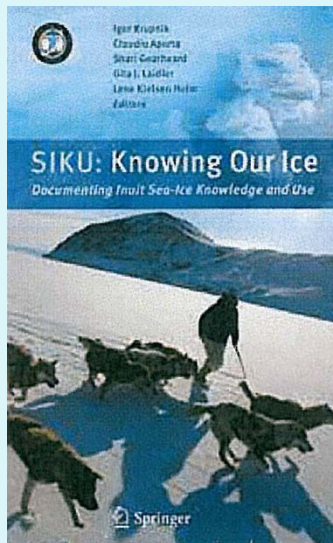
Ice Trails

Placement of trails integrates knowledge about ease of travel, safety, stability, and persistence through the season



Mass Balance Equipment

Sea Ice & Weather Monitoring



Sea Ice Outlook for Walrus



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CENTERS FOR OCEAN SCIENCES EDUCATION EXCELLENCE

COSEE ALASKA

Mission: To help ocean scientists achieve their broader impacts and share place-based knowledge of ocean climate change with the COSEE network.

What We Do: Work closely with ocean scientists, educators and coastal community members to enhance ocean and climate change literacy in formal and informal audiences and the public:

- **Weave:** Link scientists, educators and coastal communities in Alaska and nationwide with emphasis on ocean climate change.
- **Bridge:** Communicate western science and traditional knowledge about ocean climate change to Alaska and the nation.
- **Invite:** Increase participation in ocean sciences by underrepresented and under-served audiences.
- **Pathfind:** Provide tools and services to ocean scientists for effective outreach with focus on ocean climate change literacy.
- **Share:** Enhance teacher capabilities for incorporating ocean climate change and place-based knowledge into curricula.




Why We Were Established: COSEE Alaska was established as both a regional (Alaska) and thematic center (People, Oceans and Climate Change) to weave together traditional knowledge and western science about ocean climate change in the north.

- **Leadership:** Nora L. Deans, director
- **Location:** COSEE Alaska is based in Anchorage, Alaska
- **Website:** <http://www.coseealaska.net>
- **Collaborators/Partners:** Alaska Ocean Observing System, Alaska Sea Grant, University of Alaska Fairbanks, Alaska SeaLife Center, Anchorage School District, North Pacific Research Board
- **Co-Principal Investigators, and Key Project Partners:** Molly McCammon (Alaska Ocean Observing System), Michael Castellini (University of Alaska Fairbanks, School of Fisheries and Ocean Sciences), Ray Barnhardt (University of Alaska Fairbanks, Center for Cross-Cultural Studies), Paula Cullenberg (Alaska Sea Grant), Jessica Ryan (Alaska SeaLife Center), Texas Gail Raymond (Anchorage School District), Nora Deans, Director (Alaska Ocean Observing System, North Pacific Research Board), Andrea Anderson (Soundview Evaluation), Ruth Post, (University of Alaska Fairbanks), Alan Dick (Curriculum Consultant)

THEME: People, ocean, and climate

Weave – link scientists, educators, and coastal communities in Alaska and nationwide with emphasis on ocean climate change.

Bridge western science and traditional knowledge about ocean climate change to Alaska and the nation.



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A Partnership

Funded by  Division of
Ocean Sciences

University Partners + Informal Education Partners + a Formal Education Partner



Anchorage
School District



SFOS



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**Teaching Resources at
<http://www.coseealaska.net>**

Join <http://oceanseanet.ning.com>



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SEANET

An informal network of people who communicate about research in Alaska's seas

MAIN

INVITE

MY PAGE

MEMBERS

PHOTOS

VIDEOS

FORUM

EVENTS

GROUPS

BLOGS

GOOGLE DOCS

FIX

Social Networking Site



Welcome to SEANET, Seanet Cosee!
Here are a few things you can do right now...



Invite
Members



Customize
Appearance



Add
Content

EVENTS

EDIT

MARCH 2010

S	M	T	W	T	F	S
	1	2	3	4	5	6
7	8	9	10	11	12	13
14	15	16	17	18	19	20
21	22	23	24	25	26	27
28	29	30	31			

OCEAN SEANET

EDIT

SEANET is the Ocean Scientists and Educators in Alaska Network and has the goal of promoting Alaska ocean and climate change literacy.

The group is open to everyone with an interest in communicating about research and traditional knowledge about Alaska's seas - scientists, educators, outreach, communication, and media specialists; students of all ages, and community members.

Network site additions are moderated by COSEE-Alaska. Please

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