



The Arctic: Who Owns It And How Long Will It Be There?



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*Curious Polar Bears Investigate the USS Honolulu Surfacing Near the North Pole
U.S. Navy photo by Chief Yeoman Alphonso Braggs, Public Domain
http://www.navy.mil/navydata/cno/n87/usw/issue_23/north2.htm*

A Resource Packet for Educators

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The goal of this resource packet is to introduce students and teachers to the complex environmental and political changes happening today in the Arctic. As a result of global warming, the Arctic is melting at a record rate, leaving large swaths of the Arctic region ice-free for longer and longer periods of time during the year, granting unprecedented access to the region's shipping ways and resources. This new ice-free frontier has enormous political implications as countries around the Arctic scramble to establish sovereignty in the area. By bridging science and social studies, students and teachers can become better equipped to tackle this interdisciplinary problem.

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USING THIS RESOURCE GUIDE

Packet published: 2/16/11; Websites checked: 2/14/11
Please note: many descriptions were excerpted directly from the websites.

	Recommended Resources		Lesson Plans		Video
	Maps and Charts		Audio		Books
	Science, Technology, Engineering, and Math Lesson Plans				

THE GEOGRAPHY OF THE ARCTIC



ARCTIC MAPS (NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION)

<http://www.arctic.noaa.gov/maps.html>

This useful resource provides dozens of political, environmental, and historical maps of the Arctic region supplied by different environmental agencies and countries with Arctic borders. A great supplementary resource to the maps provided within this packet.

STATISTICS ON ARCTIC OCEAN

<http://www.nationmaster.com/country/xq-arctic-ocean>

Includes information primarily on the Arctic Ocean and the territories immediately surrounding the ocean. Also includes information about geography, people, disputes, and more.



ANIMATED MAP OF MELTING ARCTIC ICE: 1979-2005

http://www.nasa.gov/mpg/134729main_sea%2oice%2oaverage_NASA%2oWebV_1.mpg

This animated map illustrates changing ice covering in the Arctic from 1979-2005.

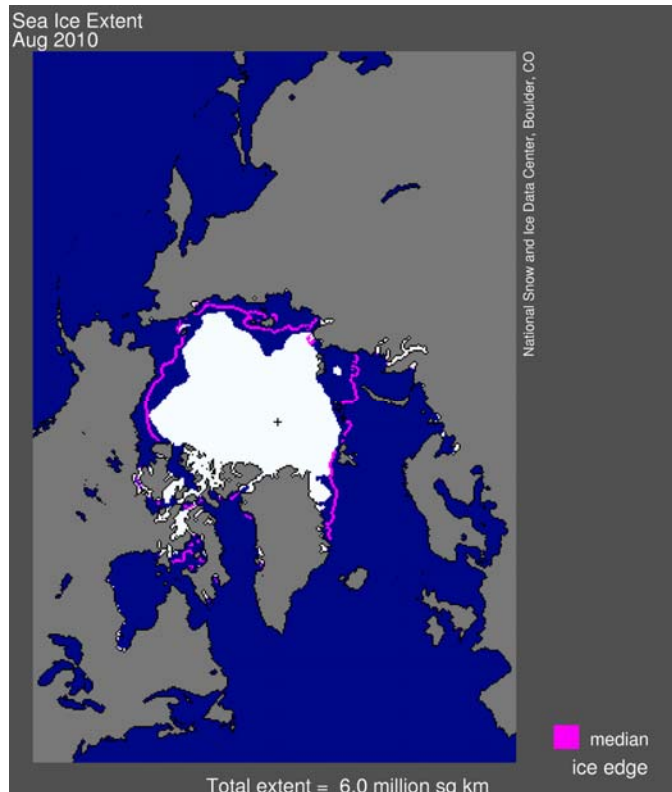


END OF SUMMER APPROACHES FOR ARCTIC SEA ICE

<http://nsidc.org/arcticseaicenews/2010/090710.html>

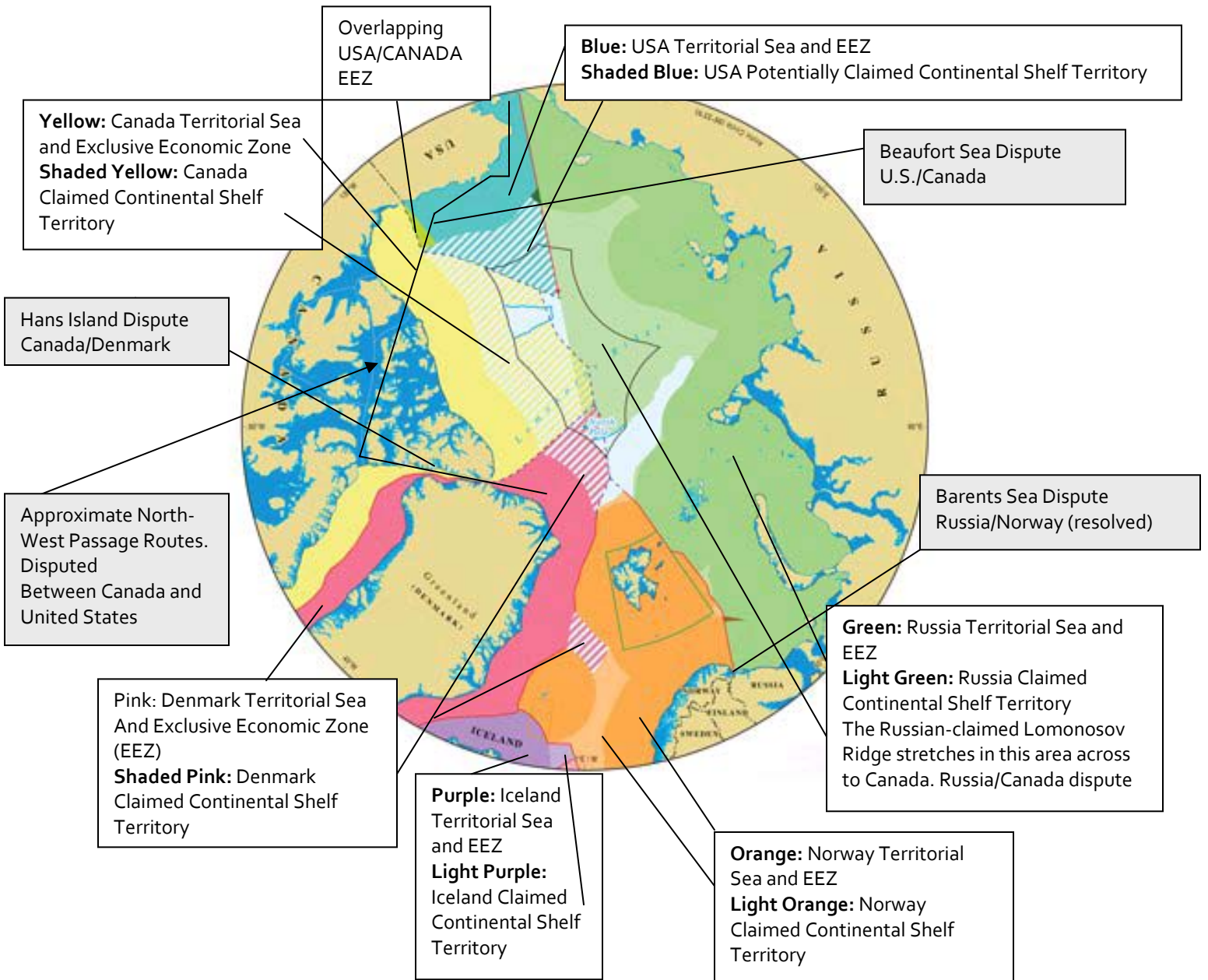
Map showing the extent of summer ice in the Arctic. Note: the outline shows average summer ice between 1979-2000. Recent summer ice levels in 2007, 2009, and 2010 have been at the second and third lowest levels in recorded history. The National Snow and Ice Data Center is part of the University of Colorado.

Political map provided by Oregon State University



THE GEOGRAPHY OF THE ARCTIC

TERRITORIAL CLAIMS IN THE ARCTIC

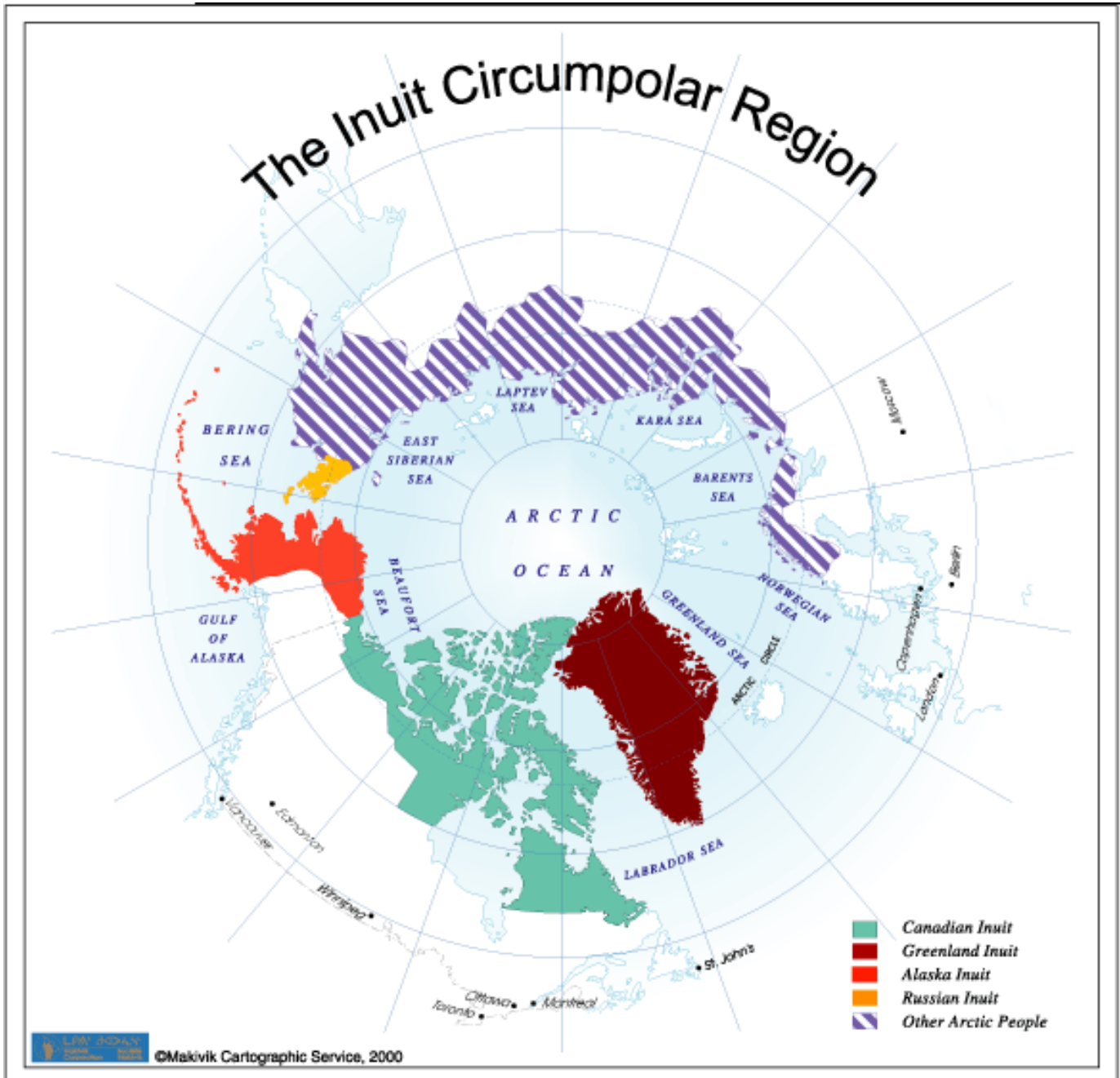


Map Produced by Durham University, United Kingdom, available for educational use. Boxes, lines, and explanations added by World Affairs Council <http://www.dur.ac.uk/resources/ibru/arctic.pdf>

Under the United Nations Law of the Seas, sovereign nations have exclusive rights to all internal waters, territorial waters extending 12 nautical miles from shore, a contiguous zone extending an additional 12 nautical miles, and maintain an exclusive economic zone (EEZ) extending an additional 200 nautical miles. **Major disputes in the Arctic center primarily on additional waters a country may claim if scientific evidence shows that the claimed area lies on a continuation of its inland continental shelf.** (See image under the UN Law of the Seas section of this packet for more information about continental shelves; also see: http://www.un.org/Depts/los/convention_agreements/texts/unclos/unclos_e.pdf)

THE GEOGRAPHY OF THE ARCTIC

THE ABORIGINAL PEOPLES OF THE ARCTIC



INDIGENOUS PEOPLES OF THE ARCTIC

http://arctic-council.org/filearchive/AHDRmap_lan-3_.jpg

This supplementary map displays Arctic people subdivided by language families.

THE GEOGRAPHY OF THE ARCTIC

This excellent list of resources about the indigenous peoples of the Arctic was provided courtesy of the University of Washington's Canadian Studies Center in the Jackson School of International Studies.

Permanent Participants, Arctic Council

Aboriginal Portal - <http://www.aboriginalcanada.gc.ca/acp/site.nsf/eng/ao35100.html>
Single window to First Nations, Métis and Inuit online resources and government programs and services. Part of Indian and Northern Affairs Canada.

Arctic Council Indigenous Peoples Secretariat - <http://www.arcticpeoples.org/>
This is the support Secretariat for the International Indigenous Peoples' Organizations that are Permanent Participants to the Arctic Council.

Saami Council (1956)– <http://www.saamicouncil.net/?deptid=1116>

Inuit Circumpolar Council (1977) – <http://inuitcircumpolar.com>

Russian Association of Indigenous Peoples of the North (1991) –
<http://www.raipon.info/en/>

Aleut International Association (1998) – <http://www.aleut-international.org/>

Gwich'in Council International (1999) – <http://www.gwichin.org/>

Arctic Athabaskan Council – <http://www.arcticathabaskancouncil.com/>

Inuit in Canada

Inuit Tapiriit Kanatami (1971) – <http://www.itk.ca/>

Nunavik – <http://www.nunavikgovernment.ca/>

Makivik Corporation – <http://www.makivik.org/>

Nunavut – www.gov.nu.ca/

Nunavut Tunngavik Incorporated - <http://www.tunngavik.com/>

Nunatsiavut – <http://www.nunatsiavut.com/>

Inuvialuit – <http://www.irc.inuvialuit.com/>

Other

Nanoq, Government of Greenland – <http://uk.nanoq.gl/>

Interuniversity Centre for Aboriginal Studies and Research, Université Laval –
<http://www.ciera.ulaval.ca/English/index.htm>

GLOBAL WARMING'S IMPACT ON THE ARCTIC

A note on terminology: Global Warming or Climate Change?

In order to be specific, we have chosen to use the term "global warming" when referring to climate change resulting in warming temperatures, such as melting glaciers, melting sea ice, rise in water temperature, etc. In other cases of climate change where warming has not occurred, we have used the term "climate change." In all cases we have retained the authors' original terminologies in the sources included in this packet.

USING SCIENCE ON A SPHERE TO EXAMINE CLIMATE CHANGE

SCIENCE ON A SPHERE

<http://sos.noaa.gov/>

Science On a Sphere (SOS)® is a room-sized, global display system that uses computers and video projectors to display planetary data onto a six-foot diameter sphere, analogous to a giant animated globe. Researchers at NOAA developed *Science On a Sphere*® as an educational tool to help illustrate Earth System science to people of all ages. Animated images of atmospheric storms, climate change, and ocean temperature can be shown on the sphere, which is used to explain what are sometimes complex environmental processes, in a way that is simultaneously intuitive and captivating.

Science On a Sphere® extends NOAA's educational program goals, which are designed to increase public understanding of the environment. Using NOAA's collective experience and knowledge of the Earth's land, oceans, and atmosphere, NOAA uses *Science On a Sphere*® as an instrument to enhance informal educational programs in science centers, universities, and museums across the country. *Science On a Sphere*® is available to any institution and is currently in operation at a number of facilities in the U.S.



SCIENCE ON A SPHERE: DATASET CATALOG

<http://sos.noaa.gov/datasets/>

This is *Science On a Sphere's* catalog of all datasets and videos to show how SOS is used to show a variety of topics from the impact of climate change, world maps, astronomy, and even animal migration. Included below are selected interesting links from the catalog. These animated datasets can be viewed on your computer for classes unable to attend a showing at SOS.



SCIENCE ON A SPHERE: TEMPERATURE CHANGE

http://sos.noaa.gov/datasets/Models_and_Simulations/IPCCtemp.html

This excellent resource shows how *Science On a Sphere* has been used to show global temperature changes from 1870 to projected changes in 2100. Datasets, videos, and other information are included.



SCIENCE ON A SPHERE: 2009 SEA ICE ANIMATION

http://sos.noaa.gov/datasets/Ocean/snow_ice.html

This SOS resource includes information about global warming's impact on melting Arctic ice and shows SOS video of sea ice's locations in the Arctic in 2009.

GLOBAL WARMING'S IMPACT ON THE ARCTIC



SCIENCE ON A SPHERE: SEA ICE MODELING: 1861-2100

http://sos.noaa.gov/datasets/Models_and_Simulations/gfdl_seaice.html

This great dataset displays Arctic ice levels from 1861 to projected 2100 levels. An excellent resource for actually seeing the impact global warming has had on Arctic ice!



SCIENCE ON A SPHERE: CARBON MONOXIDE IN 2000

http://sos.noaa.gov/datasets/Atmosphere/2000_co.html

...One of the main anthropogenic sources of carbon monoxide in the atmosphere is emissions from automobiles. This demonstration shows areas of major CO concentration.

SATELLITES SEE A DOUBLE-TEXAS SIZED LOSS IN ARCTIC SEA ICE (2005)

http://www.nasa.gov/vision/earth/environment/arcticice_decline.html

Scientists using satellite data have confirmed that the amount of sea ice that floats in the chilly Arctic is much less than it used to be, and that's probably because of warmer Arctic temperatures. Each year, during the month of September, the amount of sea ice floating in the Arctic Ocean is typically at its lowest amount for the entire year. This year, and all the way back to 2002, the amount of sea ice has been 20 percent less than the average amount seen normally between 1979 and 2000.

POLAR REGIONS (FROM THE ENVIRONMENTAL PROTECTION AGENCY)

<http://www.epa.gov/climatechange/effects/polarregions.html>

The Arctic is expected to experience the greatest rates of warming compared with other world regions. In part, this is because ice has greater reflectivity (also known as albedo) than the ocean or land. Melting of highly reflective snow and ice reveals darker land and ocean surfaces, increasing absorption of the sun's heat and further warming the planet, especially in those regions. There is evidence that climate change is already having observable impacts in the Arctic and in Antarctica. Many of these observed changes are consistent with the expected effects of climate change under a range of climate scenarios.



NEW STUDY: LOSS OF REFLECTIVITY IN THE ARCTIC DOUBLE ESTIMATE OF CLIMATE MODELS (2011)

<http://oregonstate.edu/ua/ncs/archives/2011/jan/new-study-loss-reflectivity-arctic-double-estimate-climate-models>

A new analysis of the Northern Hemisphere's "albedo feedback" over a 30-year period concludes that the region's loss of reflectivity due to snow and sea ice decline is more than double what state-of-the-art climate models estimate. The findings are important, researchers say, because they suggest that Arctic warming amplified by the loss of reflectivity could be even more significant than previously thought. The study was published online this week in Nature Geoscience. It was funded primarily by the National Science Foundation, with data also culled from projects funded by NASA, the Department of Energy and others. "The cryosphere isn't cooling the Earth as much as it did 30 years ago, and climate model simulations do not reproduce this recent effect," said Karen Shell, an Oregon State University atmospheric scientist and one of the authors of the study. ...

"Instead of being reflected back into the atmosphere, the energy of the sun is absorbed by the Earth, which amplifies the warming," Shell said. "Scientists have known for some time that

GLOBAL WARMING'S IMPACT ON THE ARCTIC

there is this amplification effect, but almost all of the climate models we examined underestimated the impact – and they contained a pretty broad range of scenarios.”



OIL SPILL PREVENTION AND RESPONSE IN THE U.S. ARCTIC OCEAN: UNEXAMINED RISKS, UNACCEPTABLE CONSEQUENCES (2010)

http://www.pewtrusts.org/our_work_report_detail.aspx?id=61733

As global warming causes Arctic ice to melt, new areas will be available for oil and gas exploration. This report examines the risks, challenges and potential consequences of oil spills associated with oil and gas exploration and production in the outer continental shelf (OCS) of the United States Arctic Ocean. The April 2010 Deepwater Horizon well blowout in the Gulf of Mexico prompted a reconsideration of the potential for a major blowout from proposed oil exploration or production in the Arctic OCS. This report was developed to contribute to the policy discussion regarding the risks and consequences of such spills.



POLAR BEARS AND CLIMATE CHANGE (2010)

<https://sas.illuminate.com/drtbl?sid=gec2010&suid=D.BoAE2EC137C1B795EEC88419518BFE>

From The 2010 Global Education Conference streaming internet lectures:

How has climate change affected polar bears and their habitat? Join Dr. Steven Amstrup live from the tundra in Churchill, Manitoba along with Dr. Ian Stirling, scientist and University of Alberta professor, and Lance Rougeux, National Director of the Discovery Education Network, as they discuss the effects of the changing climate on polar bears and their habitat. Hear what years of observation and scientific research studies are showing us about this amazing, threatened species, the polar bear. Learn what actions you can take that will benefit the polar bears and their habitat. Finally, resources will be shared that will be of benefit for session participants to connect and collaborate to make a difference locally and globally so we can reduce our carbon footprints and be better stewards of our planet.

WWF SEES SEVERE RISK IN ARCTIC OIL EXPLORATION (2010)

<http://www.reuters.com/article/idUSTRE6434W420100504>

The World Wildlife Fund is urging governments in the Arctic to suspend oil exploration due to "severe risks" of spills or blowouts until a comprehensive plan to deal with disasters is in place, a senior official said. Extreme weather, lack of regulation and the absence of a coordinated plan of action between nations could lead to a crisis worse than in the Gulf of Mexico.

NASA: GLOBAL WARMING

http://www.nasa.gov/worldbook/global_warming_worldbook.html

Good general resource about global warming, its causes, and its consequences.



ARCTIC PERMAFROST LEAKING METHANE AT RECORD LEVELS (2010)

<http://www.guardian.co.uk/environment/2010/jan/14/arctic-permafrost-methane>

Experts say methane emissions from the Arctic have risen by almost one-third in just five years, and that sharply rising temperatures are to blame. While carbon dioxide gets most of the attention in the global warming debate, methane is pound-for-pound a more potent

GLOBAL WARMING'S IMPACT ON THE ARCTIC

greenhouse gas, capable of trapping some 20 times more heat than CO₂. Although methane is present in much lower quantities in the atmosphere, its potency makes it responsible for about one-fifth of man-made warming.



ARCTIC NATIONAL WILDLIFE REFUGE: WHY TRASH AN AMERICAN TREASURE FOR A TINY PERCENTAGE OF OUR OIL NEEDS? (FROM THE NATURAL RESOURCES DEFENSE COUNCIL)

<http://www.nrdc.org/land/wilderness/arctic.asp>

Drilling for oil in America's premier wildlife sanctuary would deface the pristine landscape and threaten Alaskan wildlife. On the northern edge of our continent, stretching from the peaks of the Brooks Range across a vast expanse of tundra to the Beaufort Sea, lies Alaska's Arctic National Wildlife Refuge. An American Serengeti, the Arctic Refuge continues to pulse with million-year-old ecological rhythms. It is the greatest living reminder that conserving nature in its wild state is a core American value.

GLOBAL WARMING AND THE ARCTIC FAQs (PEW CENTER)

http://www.pewclimate.org/arctic_qa.cfm

From one of the best polling and researching organizations in the world, the Pew Center provides resources on the environment and global warming. From this section: "Why is the Arctic warming faster than the rest of the world? What will the impacts on the United States be? Is Alaska already being affected?"

LEAKING SIBERIAN ICE RAISES A TRICKY CLIMATE ISSUE (2010)

http://news.yahoo.com/s/ap/eu_climate_siberian_meltdown

Gas locked inside Siberia's frozen soil and under its lakes has been seeping out since the end of the last ice age 10,000 years ago. But in the past few decades, as the Earth has warmed, the icy ground has begun thawing more rapidly, accelerating the release of methane — a greenhouse gas 23 times more powerful than carbon dioxide — at a perilous rate.... Katey Walter Anthony, of the University of Alaska Fairbanks, has been measuring methane seeps in Arctic lakes in Alaska, Canada and Russia, starting here around Chersky 10 years ago. She was stunned to see how much methane was leaking from holes in the sediment at the bottom of one of the first lakes she visited. "On some days it looked like the lake was boiling," she said. Returning each year, she noticed this and other lakes doubling in size as warm water ate into the frozen banks. "The edges of the lake look like someone eating a cookie. The permafrost gets digested in the the lake and burps out as methane," she said in an interview in Amsterdam, the Netherlands, en route to a field trip in Greenland and Scandinavia. More than 50 billion tons could be unleashed from Siberian lakes alone, more than 10 times the amount now in the atmosphere.

ARCTIC CLIMATE PERSPECTIVES



<http://www.teachersdomain.org/resource/echo07.sci.life.coast.climate/>

This video, adapted from material provided by the ECHO partners, shows the changes now happening in Barrow, Alaska, due to global warming. The Iñupiaq people who live in Barrow present their observations of these changes based on their centuries-old knowledge of their environment, and describe how these changes are already affecting their lives. Scientists who have come to Barrow to study climate change also offer their perspective.

GLOBAL WARMING'S IMPACT ON THE ARCTIC

WARMING NORTH ATLANTIC WATER TIED TO HEATING ARCTIC, ACCORDING TO NEW STUDY (2011)

<http://dirwww.colorado.edu/news/r/9059018f4606597f20dc4965fa9c9104.html>

The temperatures of North Atlantic Ocean water flowing north into the Arctic Ocean adjacent to Greenland—the warmest water in at least 2,000 years—are likely related to the amplification of global warming in the Arctic, says a new international. The study showed that water from the Fram Strait that runs between Greenland and Svalbard has warmed roughly 3.5 degrees Fahrenheit in the past century. The Fram Strait water temperatures today are about 2.5 degrees F warmer than during the Medieval Warm Period, which heated the North Atlantic from roughly 900 to 1300 and affected the climate in Northern Europe and northern North America.

ONE SCIENTIST'S HOBBY: RECREATING THE ICE AGE (2010)

http://news.yahoo.com/s/ap/20101127/ap_on_re_eu/eu_russia_ice_age_park

Wild horses have returned to northern Siberia. So have musk oxen, hairy beasts that once shared this icy land with woolly mammoths and saber-toothed cats. Moose and reindeer are here, and may one day be joined by Canadian bison and deer. Later, the predators will come—Siberian tigers, wolves and maybe leopards. Russian scientist Sergey Zimov is reintroducing these animals to the land where they once roamed in millions to demonstrate his theory that filling the vast emptiness of Siberia with grass-eating animals can slow global warming.....He believes herds of grazers will turn the tundra, which today supports only spindly larch trees and shrubs, into luxurious grasslands. Tall grasses with complex root systems will stabilize the frozen soil, which is now thawing at an ever-increasing rate, he says.

WORLD CLOCK 2010: ENVIRONMENT

<http://www.poodwaddle.com/worldclock.swf>

This world clock for the environment keeps a running tally of interesting statistics such as projected global warming temperatures, CO₂ emissions, forest loss, species extinction, and many other sets of data.

Climate Change in the Arctic: How Different News Stories Get Reported

Students may compare these articles to see how news stories get reported and how data can be manipulated to fit one's political agenda.

From *the Guardian*, in the United Kingdom

<http://www.guardian.co.uk/environment/2010/mar/22/wind-sea-ice-loss-arctic>

Headline and subtitle: Wind contributing to Arctic sea ice loss, study finds; New research does not question climate change is also melting ice in the Arctic, but finds wind patterns explain steep decline.

"Ice blown out of the region by Arctic winds can explain around one-third of the steep downward trend in sea ice extent in the region since 1979, the scientists say."

From *Fox News* Online

<http://www.foxnews.com/scitech/2010/03/22/winds-warming-leading-arctic-ice-melt/>

Headline and subtitle: Winds, Not Warming, Leading to Arctic Ice Melt; Strong arctic winds rather the effects of global warming can explain the dramatic loss of ice in the Arctic Ocean, explains a new scientific paper. (sic)

"The article, soon to be published in the journal *Geophysical Research Letters*, found that half of the annual variation in sea ice seen each September can be attributed to changes in wind patterns, not merely global warming as has previously been theorized."

GLOBAL WARMING'S IMPACT ON THE ARCTIC

THE EFFECTS OF MELTING ICE AND RISING SEA LEVELS ON THE REST OF THE WORLD

AS GLACIERS MELT, SCIENCE SEEKS DATA ON RISING SEAS

http://www.nytimes.com/2010/11/14/science/earth/14ice.html?_r=1&ref=science

Scientists long believed that the collapse of the gigantic ice sheets in Greenland and Antarctica would take thousands of years, with sea level possibly rising as little as seven inches in this century, about the same amount as in the 20th century. But researchers have recently been startled to see big changes unfold in both Greenland and Antarctica. As a result of recent calculations that take the changes into account, many scientists now say that sea level is likely to rise perhaps three feet by 2100 — an increase that, should it come to pass, would pose a threat to coastal regions the world over.



SCIENCE ON A SPHERE: SEA LEVEL RISE

http://sos.noaa.gov/datasets/Ocean/sea_level.html

This page provides information on how *Science On a Sphere* has been used to show the impact rising sea levels, caused by global climate change, will have on coastal communities. Video recordings of *Science On a Sphere* displaying this information is also included in the link.

SEA LEVEL RISE COULD HIT POOR COUNTRIES HARD: STUDY (2007)

<http://www.reuters.com/article/idUSN1340440520070213>

Even a small rise in the world's sea levels, predicted as a result of global warming, could make environmental refugees of some 56 million people in developing countries, a World Bank economist said on Tuesday.

RISING SEA LEVELS: HOW WILL WASHINGTON COPE? (2010)

http://www.seattlepi.com/local/426490_sealevels10.html

Sea levels around Washington are expected to be six inches higher by 2050, perhaps 13 inches higher by 2100. Is the impact of a six-inch rise a little or a lot? What should the state do in the meantime to prepare? State experts say a six-inch rise in sea level will be significant ecologically. Meanwhile, the Washington Department of Ecology has begun an effort to contact business, local governments and others that would likely be affected of those ecological changes. The idea is to begin brainstorming measures that can counter the ill effects of a rising sea level.



RECORD MELT FROM GREENLAND ICESHEET IN 2010

http://news.yahoo.com/s/afp/20110122/sc_afp/scienceclimatewarminggreenlandicesheet

Greenland's icesheet, feared as a major driver of rising sea levels, shed a record amount of melted snow and ice in 2010, scientists reported Friday, a day after the UN said last year was the warmest on record. The 2010 runoff was more than twice the average annual loss in Greenland over the previous three decades, surpassing a record set in 2007, said the study, published in the US-based journal *Environmental Research Letters*. Ice melt has now topped this benchmark every year since 1996, according to the paper, derived from long-term satellite and observational data. Were it to melt entirely, Greenland's icesheet would drive up ocean levels by some seven metres (23 feet), drowning coastal cities around the world.

GLOBAL WARMING'S IMPACT ON THE ARCTIC

No credible projections today include a doomsday scenario for the coming centuries. But recent research, including the new study, suggest that Greenland will contribute more to rising seas than predicted only a few years ago. Globally, the year was also the warmest ever recorded, as was the decade it brought to a close, the UN's World Meteorological Organisation (WMO) said on Thursday. The new study focused on surface melt, runoff and the number of days when bare ice, free of snow, is exposed to the Sun's radiative force. In 2010, "melting in some areas stretched up to 50 days longer than average," Tedesco said. The study also showed that land area where melting has been observed has been increasing at a rate of about 17,000 square kilometers (6,500 square miles) per year.

Not only do melting snow and ice flow directly into the sea, they also form torrential under-ice streams that lubricate the passage of glaciers toward the ocean. In assessing the icesheet's total mass loss, melt is only part of the picture, Tedesco said. "Our calculations do not account for losses due to calving"—the splitting of large chunks of glacier ice into the sea—"and ice dynamics, which are as big if not bigger than those due to surface melting," he said.

COLLAPSE OF ANTARCTIC ICE SHEET WOULD LIKELY PUT WASHINGTON, D.C. LARGELY UNDERWATER (2009)

<http://www.sciencedaily.com/releases/2009/02/090205142132.htm>

While not related to the Arctic, this research examines the impact global warming will have on the Antarctic and how it would cause a significant rise in sea level that would affect the United States. University of Toronto and Oregon State University geophysicists have shown that should the West Antarctic Ice Sheet collapse and melt in a warming world – as many scientists are concerned it will – it is the coastlines of North America and of nations in the southern Indian Ocean that will face the greatest threats from rising sea levels. The catastrophic increase in sea level, already projected to average between 16 and 17 feet around the world, would be almost 21 feet in such places as Washington, D.C., scientists say, putting it largely underwater. Many coastal areas would be devastated. Much of Southern Florida would disappear, according to researchers at Oregon State University

SINKING FEELING IN TUVALU (2002)

<http://news.bbc.co.uk/2/hi/asia-pacific/2219001.stm>

Tuvalu's nine islands are little more than thin ribbon-like atolls scattered in the immensity of the Pacific Ocean. At their highest point, they stand no more than four 13 feet above sea level and if predictions of rising sea levels caused by global warming are correct, they could become the world's first casualties of climate change. That is something that is worrying the country's 11,000 inhabitants. ... The local people are shaking their heads in bewilderment—it is August, and this is not the right season for such high tides. "Maybe it's to do with that greenhouse effect that's been announced all over the world," said one woman. "But I didn't imagine it would be like this," she added. Like her neighbors, she is packing her belongings, ready to decamp to another part of the island for the night. Another high tide is expected, and they have been warned there might be further flooding.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

UNSTATED ASSUMPTIONS COLOR ARCTIC SOVEREIGNTY CLAIMS (2009)

<http://www.sciencedaily.com/releases/2009/05/090528135248.htm>

Is the Arctic Ocean just water that you pass over, or is it land with water on top of it—land that belongs to a country? When countries such as Russia talk of resource extraction, they are thinking of the Arctic as land with water on top of it. Canada makes the same assumption when it talks of the Northwest Passage as belonging to Canada. The U.S., however, views the Northwest Passage as just water—water that people pass over to travel from one place to another. Dr. Steinberg adds that some of those assumptions are built right into our maps. Look at a map of the world: Land areas are divided into countries, each in a different color. That reinforces the idea of ownership. But on a map the sea is a colored a uniform blue—a graphic representation of the oceans being freely accessible to all. The same idea applies to Antarctica, which is generally colored white on maps not marked by firm territorial divisions. In the Arctic, there is one further complicating factor: When the ocean is covered by ice, it can be walked on and to some extent used like land; but when the ice melts, the Arctic is water.

COUNCIL ON FOREIGN RELATIONS: THE ARCTIC

<http://www.cfr.org/region/484/arctic.html>

Features a database on articles related to foreign policy in the Arctic published by Council on Foreign Relations scholars. Great resource!

CLIMATE CHANGE COULD LEAD TO ARCTIC CONFLICT, WARNS SENIOR NATO COMMANDER (2010)

<http://www.guardian.co.uk/environment/2010/oct/11/nato-conflict-arctic-resources>

One of NATO's most senior commanders has warned that global warming and a race for resources could lead to conflict in the Arctic.

CANADIANS PREPARED TO FIGHT FOR ARCTIC: SURVEY (2011)

http://news.yahoo.com/s/afp/20110125/wl_canada_afp/canadaarcticpolitics_20110125204159

Canadians rank the Arctic as their top foreign policy priority and support shifting up to 3,000 troops from UN missions abroad to defend disputed claims in the far north. This view puts Canada at odds with its seven Arctic neighbors and has "ominous implications" for cooperation in the resource-rich region, the EKOS poll's authors warned. The results, published by the University of Toronto's Munk School of Global Affairs and the Walter & Duncan Gordon Foundation, show that while Canadians say they welcome working with other countries, a "clear majority" also wants to increase Canada's military presence in the Arctic. Forty-three percent of Canadians said their government should pursue a firm line in defending Canadian sections of the Arctic. This hard line was echoed by 36 percent of respondents in Iceland, 34 percent in Russia, and 10 percent or less in the United States, Sweden, Norway, Finland and Denmark. Fifty-eight percent of Canadians also support a strengthened military presence in the north to protect against international threats. In addition, 49 percent of Canadians would like Ottawa to assert full sovereignty over the Beaufort Sea while 62 percent of Americans would prefer to strike a deal with Canada to carve up the disputed seabed. "Perhaps the most noteworthy and troubling conclusion of this research is that Canada stands relatively alone on many issues," the study concluded.

Canadians rank the Arctic as their top foreign policy priority. A majority also supports militarizing the Arctic to defend Canadian Arctic sovereignty.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

PLANNED ARMY BASE, PORT IN NORTH HEAT UP ARCTIC QUEST (2007)

<http://www.cbc.ca/canada/north/story/2007/08/08/arctic-setup.html>

The prospect of the new, strategically placed military centre is exciting for Pierre Leblanc, the former commander of the Canadian Forces in the North. "That facility, being a military facility sitting on the Northwest Passage, will also give a very clear political signal to the rest of the international community that we are serious about our sovereignty," Leblanc said.

THE GREAT GAME MOVES NORTH (2009)

<http://www.foreignaffairs.com/articles/64905/scott-g-borgerson/the-great-game-moves-north?page=show>

The next few years will be critical in determining whether the region's long-term future will be one of international harmony and the rule of law, or a Hobbesian free-for-all. Although the Bush administration took a huge step by publishing a new Arctic policy during its final week in office, the Obama administration must do far more to keep Washington from being further marginalized in this geostrategically important region.

ARCTIC SUMMIT IN MOSCOW HEARS RIVAL CLAIMS (2010)

<http://www.bbc.co.uk/news/world-europe-11387175>

An international meeting to try to prevent the Arctic becoming the next battleground over mineral wealth is taking place in Moscow. One quarter of the world's resources of oil and gas are believed to lie beneath the Arctic Ocean. Russia, Norway, Canada, Denmark and the United States have already laid claim to territory in the region.

BATTLE FOR THE ARCTIC HEATS UP (2009)

<http://www.cbc.ca/canada/story/2009/02/27/f-arctic-sovereignty.html>

This interesting article discusses Canada's territory claims to various waters in the arctic and why they believe the UN Law of the Seas Treaty guarantees Canada's claims to those areas.



UPI interviews Michael Byers, author of *Who Owns The Arctic?*

http://www.upi.com/Science_News/Resource-Wars/2010/04/02/Interview-Expert-decodes-Arctic-conflict/36031270235949/

Q. How about shipping in the Arctic Ocean, which is expected to become ice-free in the summer months?

A. We need additional rules on that definitely. Of course no one contemplated shipping in the center of the Arctic Ocean back in 1982 when the U.N. convention was adopted. The International Maritime Organization some years ago adopted a set of guidelines on Arctic shipping. Those guidelines need to be made into a multilateral treaty.

Q. ...military activities have increased in the region. And there are observers who fear a potential military conflict over resources in the Arctic.

A. That's unrealistic. If you look at the statements by government officials—in most instances, the military buildup is directed at non-state threats. When they talk about their Arctic rights they almost always talk about rights that are already within their jurisdiction if they are an Arctic Ocean country like Russia. Or in the case of China, they are talking about rights in the internationalized areas that will remain in the central Arctic Ocean. My sense is that countries like Russia and China have enough problems elsewhere and therefore don't want to create problems in the Arctic.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

CHINA PREPARING FOR ARCTIC MELT COMMERCIAL OPPORTUNITIES (2010)

http://www.usatoday.com/news/world/environment/2010-03-01-china-arctic-melt_N.htm

Competing sovereignty claims in the region are primarily being discussed by the five nations bordering the Arctic: the U.S., Canada, Russia, Norway, and Denmark. Though China is keeping a low profile in those disputes, it's showing growing interest in the Arctic, the Stockholm International Peace Research Institute said. China is seeking a more active role in the Arctic Council — an intergovernmental body that deals with issues faced by Arctic nations and indigenous populations there.

THE UN LAW OF THE SEA AND OTHER INTERNATIONAL COOPERATION

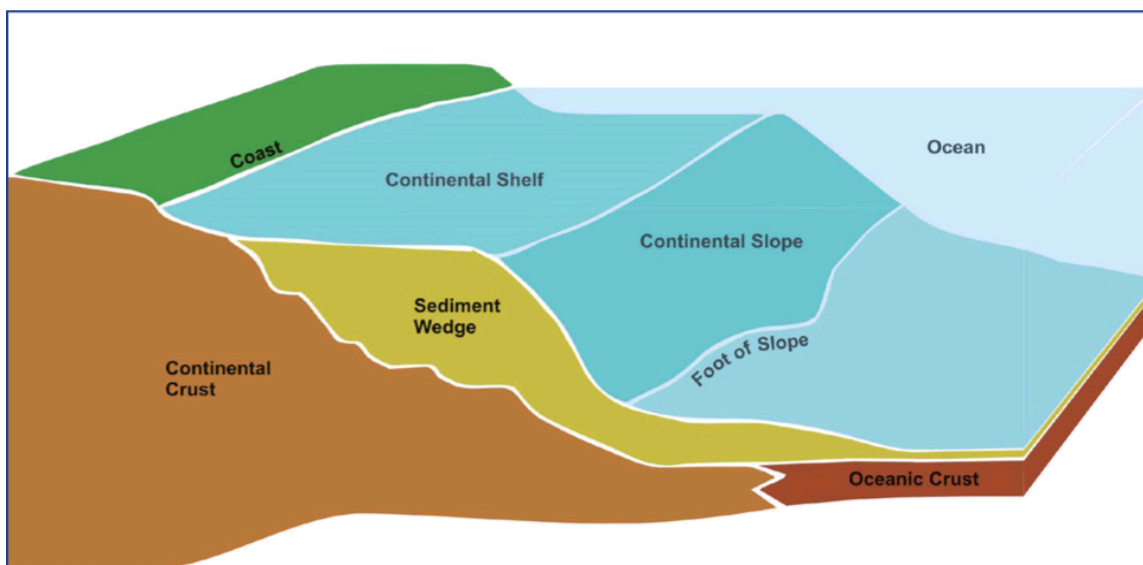


THE UNITED NATIONS LAW OF THE SEA TREATY

<http://www.un.org/depts/los/index.htm>

The United Nations Law of the Seas Treaty would formally establish national and international boundaries for all waters to determine usage rights for fishing, other natural resource extraction, transportation through waters, etc. This United Nations website provides exhaustive information on the actual treaty, signatories to it, and more.

Under the United Nations Law of the Seas, sovereign nations have exclusive rights to all internal waters, territorial waters extending 12 nautical miles from shore, a contiguous zone extending an additional 12 nautical miles, and maintain an exclusive economic zone extending an additional 200 nautical miles. Major disputes in the Arctic center primarily on additional waters a country may claim if scientific evidence shows that the claimed area lies on a continuation of its inland continental shelf. A continental shelf is that part of a country's land that now lies immediately below the ocean's surface. Generally speaking, this land would have been above water before major environmental changes, such as an ice age, in the past.



Natural Resources of Canada, government homepage http://gsc.nrcan.gc.ca/org/atlantic/unclos_e.php

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

LAW OF THE SEA CONVENTION

<http://www.state.gov/g/oes/ocns/opa/convention/>

The Law of the Sea Convention sets forth a comprehensive framework governing uses of the oceans. Adopted in 1982, and substantially modified by the 1994 Agreement relating to the deep seabed mining provisions, the Convention has been in effect since 1994. There are now 157 parties to the Convention, including almost all of the traditional allies of the United States. Since 1983, the United States has been abiding by, and enjoying the rights accorded by, the provisions of the Convention covering the traditional uses of the ocean, in accordance with the Ocean Policy Statement issued by President Ronald Reagan. Subsequent Administrations have supported the Convention, which President Bill Clinton submitted to the Senate in 1994.

INTERNATIONAL SEABED AUTHORITY

<http://www.isa.org.jm/en/scientific>

The International Seabed Authority is an autonomous international organization established under the 1982 United Nations Convention on the Law of the Sea and the 1994 Agreement relating to the Implementation of Part XI of the United Nations Convention on the Law of the Sea. A principal function of the Authority is to regulate deep seabed mining and to give special emphasis to ensuring that the marine environment is protected from any harmful effects which may arise during mining activities, including exploration... The website includes in-depth scientific research on specific seabed areas, maps, links, and other useful information.

INTERNATIONAL MARITIME ORGANIZATION

<http://www.imo.org/>

IMO is the United Nations specialized agency with responsibility for the safety and security of shipping and the prevention of marine pollution by ships. The purposes of the Organization are "to provide machinery for cooperation among Governments in the field of governmental regulation and practices relating to technical matters of all kinds affecting shipping engaged in international trade; to encourage and facilitate the general adoption of the highest practicable standards in matters concerning maritime safety, efficiency of navigation and prevention and control of marine pollution from ships".

ARCTIC COUNCIL



<http://www.arctic-council.org/>

The Ottawa Declaration of 1996 formally established the Arctic Council as a high level intergovernmental forum to provide a means for promoting cooperation, coordination and interaction among the Arctic States, with the involvement of the Arctic Indigenous communities and other Arctic inhabitants on common Arctic issues, in particular issues of sustainable development and environmental protection in the Arctic. Member States of the Arctic Council are Canada, Denmark (including Greenland and the Faroe Islands), Finland, Iceland, Norway, Russian Federation, Sweden, and the United States of America.

ORGANIZATIONS WORKING IN THE ARCTIC

<http://arcticportal.org/organisations>

This link provides a list of international organizations working in the Arctic. The list includes security groups, scientific research groups, conservation groups, etc.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

REPUBLICAN RIGHTWINGERS FIND IRAQ-ON-SEA (2007)

<http://www.guardian.co.uk/world/2007/oct/25/usa.antarctica>

The UN law of the Sea is supported by everyone from environmentalists to George Bush—just not fulminating unilateralists in the Senate. Conservative senators and critics of the United Nations are attempting once again to stop the US joining an international treaty on access to the world's waters, despite support for it from the military and George Bush. The UN's Convention of the Law of the Sea, already ratified by more than 150 countries, sets up a system to manage navigation and explore the oceans. Environmental groups endorse the treaty's protection of global fish stocks, the US navy endorses its assurance of free movement and the oil industry's trade group endorses its promise of a level playing field for companies staking claim to drill in the Arctic. But Republican antagonists in the Senate, several of whom have derailed the treaty twice in the past, discount even the Bush administration's backing. They yesterday blocked a preliminary ratification vote, and in doing so declared it an auspicious date for foes of international institutions.

SOVEREIGNTY IN THE ARCTIC: AN ANALYSIS OF TERRITORIAL DISPUTES

http://www.law.fsu.edu/journals/transnational/vol18_2/isted.pdf

This supplementary, academic resource provides a concise overview of emerging conflicts in the Arctic and how international law, particularly the UN Law of the Seas, can help resolve the conflicts. Also includes useful information on perspectives and goals of individual Arctic nations and explanations for why there will be conflict over the territory.

HOW THE LAW OF THE SEA CONVENTION BENEFITS THE UNITED STATES

http://www.gs institute.org/docs/11-20-04_UNCLOS.pdf

This policy briefing provides an overview for why most observers, Democrats and Republicans, and the Global Security Institute, believe the UN Law of the Sea Convention will benefit the United States economically, environmentally, and militarily. "The Bipartisan Security Group consists of Republican and Democratic experts with experience in diplomacy, law, intelligence and military affairs. BSG supports Members of Congress by providing reliable information and critiques of global security issues. An emphasis is placed on multilateralism and strengthening the rule of law."

OBAMA COMMITTED TO RESOLVING ARCTIC DISPUTES

<http://www.montrealgazette.com/travel/Obama+committed+resolving+Arctic+disputes+Clinton/1470347/story.html>

U.S. Secretary of State Hillary Clinton on Monday said the Obama administration is "committed" to ratifying the United Nations Convention on the Law of the Sea, touting the decades-old treaty as the best way for Arctic powers to resolve competing territorial claims over the Far North's resource-rich seabed. With global warming opening the Northwest Passage to increased navigation — and the potential for competition among Canada, the United States, Russia and other nations in tapping the Arctic's vast oil and gas reserves — Clinton said she's committed to a "high level of engagement" in negotiating future disputes over the region. "It is crucial we work together," Clinton said at the opening of an international summit on the future of the Arctic and Antarctica.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

CANADA GETS COLD SHOULDER AT ARCTIC MEETING (2010)

<http://www.thestar.com/news/canada/article/787178--canada-gets-cold-shoulder-at-arctic-meeting>

The so-called Arctic coastal states meetings were held again in 2010. "The first meeting of Arctic coastal states in 2008 was held in Ilulissat, Greenland and met by a flurry of diplomatic protest that was only dampened when the three countries left out of the talks were assured it would be a 'one-off.' The coastal state meetings again included only nations with coastlines in the Arctic. That means Sweden, Finland, and Iceland who have only territorial water in the Arctic and are members of the Arctic Council were not included in this meeting. Also, unlike the Arctic Council, the coastal state meetings do not grant member status to representatives of indigenous peoples who have also been left out of the meetings.

CLINTON REBUKE OVERSHADOWS CANADA'S ARCTIC MEETING (2010)

<http://www.reuters.com/article/idUSTRE62S4ZP20100329>

Canadian Foreign Minister Lawrence Cannon gathered his counterparts from Russia, Norway, the United States and Denmark for three hours of talks on Monday on the grounds that they were the only nations with Arctic coastlines. The decision prompted unhappiness in Sweden, Finland and Iceland, who are also members of the eight-nation Arctic Council—traditionally the body where most important decisions on the region are taken. "Significant international discussions on Arctic issues should include those who have legitimate interests in the region," Clinton said in a statement issued before the meeting had even begun. "I hope the Arctic will always showcase our ability to work together, not create new divisions." Global warming is gradually melting the Arctic ice cap, raising the possibility of increased shipping and mineral extraction in the remote and environmentally sensitive region. Canada and the United States have very close ties and Clinton's statement was the first open official rebuke of Ottawa since the months leading up to the 2003 Iraq War, which Canada refused to participate in. Cannon spent much of his closing news conference responding to questions about Clinton's statement and insisting he was not trying to marginalize the Arctic Council. "This meeting was not (designed) to replace or undermine the Arctic Council ... this forum is not meant to become a permanent institution," he said. Clinton was not present at the news conference. The five nations that did participate in the meeting are the only ones engaged in a protracted process of filing territorial claims in the Arctic, a region that experts say contains rich oil and gas deposits.

NEW SHIPPING RULES URGED TO AVERT ARCTIC TITANIC

<http://www.reuters.com/article/idUSTRE70N3ND20110124>

The Arctic Ocean needs tough new shipping rules as a rapid thaw opens the remote, icy region and brings risks of disasters on the scale of the Titanic, politicians and experts said on Monday. "We need to agree on a new binding polar code" for shipping, Norway's Foreign Minister Jonas Gahr Støre told Reuters during a conference on "Arctic Frontiers" in Tromsø, a city north of the Arctic Circle in Norway. New shipping standards could cover designs to resist ice, new equipment and navigation rules, he said. In one step toward improved safety, the eight nations in the Arctic Council are due to agree new search and rescue rules in May. Countries around the Arctic Ocean are shifting to consider regulations as the region opens more to oil and gas exploration and shipping. Referring to climate change, Støre said: "The trends are not slower in the Arctic, they are faster."

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

RATIFYING THE LAW OF THE SEA (OP-ED) (2009)

http://www.boston.com/bostonglobe/editorial_opinion/oped/articles/2009/03/16/ratifying_the_law_of_the_sea/

America has been drawn into a 24/7 debate over how to rescue first the United States, and then the world, from drowning in an economic abyss. As a result, many probably missed a relatively obscure yet significant development. Google Earth 5.0 unveiled the newest state of the art - the ocean floor is now mapped on the Internet. This advance underscores the crucial role the sea plays in our lives. It is where our environment is shaped, 90 percent of our commerce is shipped, and the source of much food and energy.

As President Obama grapples with economic recovery, he also has a chance to promote global security and stability by advocating for ratification of the UN Convention on the Law of the Sea. The treaty codifies widely accepted principles of freedom of navigation and overflight, and establishes rules for use of the world's oceans. It is a powerful vehicle through which signatories can leverage support for national priorities within the international community. Its provisions address national security and economic interests, provide guidelines for commercial activity, and set standards to protect the marine environment.

The United States has 12,500 miles of coastline and 360 major commercial ports. Among the world's largest importers and exporters of goods and services, it has more to gain by ratifying the convention than by avoiding it, especially against the backdrop of global recession. In the absence of such a legal framework, history is replete with examples of rogue nations unduly restricting maritime access and encroaching upon others' interests, potentially compromising military operations, disrupting commerce, and flouting accountability for environmental degradation. So far, 156 countries and the European Community have ratified the treaty. Some critics assert that there is no compelling reason for the United States to ratify the treaty because it already adheres to its provisions under customary international law. But this approach is fraught with peril. Customary international law is constantly evolving and does not offer the stability and predictability afforded by the convention.

Many diplomats and national security experts maintain that US ratification will strengthen US and transnational initiatives to deter nuclear proliferation. Moreover, the United States would have standing in deliberations that will shape future development of the law of the sea. Another provision of the treaty pertains to the Arctic, a region undergoing rapid environmental change and extensive exploration for natural resources. The treaty affords the five Arctic states - Norway, Denmark, Russia, Canada, and the United States - the right to claim the Arctic seabed, including mineral and oil extraction rights. By ratifying, the US would have a seat on the Council of the International Seabed Authority, which regulates deep-sea mining.

The United States played a pivotal role during treaty negotiations in the early 1980s, but President Reagan ultimately refused to sign the convention over concerns about a provision involving deep-seabed mining that he felt diluted US voting power. That provision was subsequently modified to eliminate such concerns in 1994.

Support for ratification is bipartisan. Proponents include both former presidents Bush and Clinton; former secretaries of state Condoleezza Rice, Colin Powell, and Madeleine Albright; Secretary of State Hillary Clinton; Admiral Mike Mullen, chairman of the Joint Chiefs of Staff; Admiral Thad Allen, commandant of the Coast Guard; major environmental groups and many others. But a relatively small number of senators have held the treaty hostage. Buoyed by the outdated arguments of the Reagan era and ideological opposition to the UN, opponents have stopped it from coming to a vote. This gamesmanship may result in the United States faltering in the scramble for the Arctic.

Now is the time for the United States to join the overwhelming majority of nations that have ratified the treaty and distance itself from other notable outliers like Iran, North Korea, and Syria. Ratification will advance US national interests and send a clear message that America supports multilateral cooperation, the rule of law, and due process.

Melissa Bert is a national security fellow at the Harvard Kennedy School and a captain in the US Coast Guard. Mark Schlakman is a senior program director at Florida State University's Center for the Advancement of Human Rights.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

THE UNITED STATES AND CANADA

CANADA READY TO SETTLE BEAUFORT SEA DISPUTE WITH U.S. (2010)

<http://www.vancouversun.com/Canada+ready+settle+Beaufort+dispute+with+Cannon/3029507/story.html>

Foreign Affairs Minister Lawrence Cannon has issued an open invitation to the U.S. to begin serious negotiations with Canada to end their decades-old territorial dispute in the Beaufort Sea — a development hailed by one of Canada's leading Arctic experts as a "clear" and "important" push to quickly settle the maritime boundary between the two countries ahead of potential offshore oil and gas development.

DISPUTE OVER NW PASSAGE REVIVED (2006)

<http://www.washingtonpost.com/wp-dyn/content/article/2006/11/05/AR2006110500286.html>

A long-standing legal wrangle between the United States and Canada could complicate future shipping through the Arctic as global warming melts the ice in the Northwest Passage. The United States contends that the Northwest Passage, though owned by Canada, is an international strait with free passage for all, like other straits around the world. U.S. officials say they are following a long-standing position in favor of keeping straits free to all navigation and want unimpeded movement of U.S. ships.



CANADA AND THE ARCTIC: THE ISSUE OF NORTHERN SOVEREIGNTY

<http://www.wilsoncenter.org/ondemand/index.cfm?fuseaction=media.play&mediaid=2CoA22C2-AE43-0B5E-B9F20E93DoF6F95C>

A panel discussion exploring why the Canadian government believes that strengthening its Arctic sovereignty is critical to Canada's national interest and identity. The conference will also assess the future direction and potential implications of Canadian Arctic policy on Canada-U.S. relations. Speakers: Michael Byers, Academic Director, Liu Institute for Global Issues, University of British Columbia and Rob Huebert, Associate Director, Centre for Military and Strategic Studies, University of Calgary. Includes a video of the discussion and a synopsis of the event.

U.S. SLOW TO PROTECT ARCTIC INTERESTS

http://www.upi.com/Top_News/US/2011/01/10/US-slow-to-protect-arctic-interests/UPI-16871294680118/

U.S. reaction to the opening of arctic sea lanes and access to seabed resources as global warming reduces ice in the region is slow and inadequate, experts say. The U.S. arctic is melting quickly because of accelerated climate change and the opening of the region has nations jockeying for position, while U.S. government and military officials worry the United States is not moving quickly enough to secure American interests in the region, *The Washington Post* reported Sunday. The Obama administration considers the arctic an area of key strategic interest, and the U.S. military expects the arctic will become "ice-free" for several weeks each summer, possibly as early as 2013. However, military and civilian resources needed to successfully operate there are lacking and there are few indications of any significant changes coming. The Government Accountability Office, in a September report, said the Coast Guard lacks adequate infrastructure or equipment in the arctic.

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

Many in the Coast Guard operating in the region agree. "We definitely don't have the infrastructure available to operate for an extended period of time in the arctic in the summer, much less in the winter when it's more critical for logistical purposes," Lt. Cmdr. Nahshon Almandmoss said.

RUSSIA AND CANADA

MILES BELOW THE NORTH POLE, RUSSIAN MINI-SUBS LAY CLAIM TO ARCTIC WEALTH (2007)

<http://www.guardian.co.uk/world/2007/aug/03/russia.oil>

Russia symbolically staked its claim to billions of dollars worth of oil and gas reserves in the Arctic Ocean yesterday as two mini-submarines reached the sea bed more than two and a half miles beneath the North Pole. In a record-breaking dive the two craft planted a one metre-high titanium Russian flag on the underwater Lomonosov ridge, which Moscow claims is directly connected to its continental shelf.



RUSSIA AND CANADA REFER ARCTIC DISPUTE TO U.N. (2010)

http://blog.foreignpolicy.com/posts/2010/09/16/russia_and_canada_to_refer_arctic_dispute_to_un

Russian Foreign Minister Sergei Lavrov and his Canadian counterpart Lawrence Cannon met today about competing claims over the Lomonosov Ridge, an underwater ridge of continental crust under the Arctic Ocean claimed by both territories and pledged to let the United Nations resolve the dispute.

RUSSIA TO DEPLOY SPECIAL ARCTIC FORCE BY 2020

<http://www.globalsecurity.org/wmd/library/news/russia/2009/russia-090327-rianovostio2.htm>

Russia will create by 2020 a group of forces to protect its political and economic interests in the Arctic, but does not plan to militarize the region, a spokesman for the Russian Security Council said on Friday. He said the council had recently posted on its website a document, "The fundamentals of Russian state policy in the Arctic up to 2020 and beyond," which outlines the country's strategy in the region, including the deployment of military, border and coastal guard units "to guarantee Russia's military security in diverse military and political circumstances." "However, it does not mean that we are planning to militarize the Arctic. We are focusing on the creation of an effective system of coastal security, the development of arctic border infrastructure and the presence of military units of an adequate strength," the official said.

CANADA AND DENMARK

CANADA, DENMARK DISPUTE OWNERSHIP OF TINY ARCTIC ISLAND (2005)

<http://www.cbc.ca/canada/story/2005/07/25/hansisland050725.html>

Defence Minister Bill Graham's recent visit to an Arctic island off the northwest coast of Greenland has set off a diplomatic row. Last week, Graham walked about on 1.3-square-kilometre Hans Island, claimed by both Canada and Denmark. Graham said Canada has always considered Hans Island its territory. "Our view is that it's part of Canada and we continue to be there, to go there, the Danes go there as well and we are making sure that the Danes know that this part of the Canadian territory," he said. Denmark called in the Canadian ambassador to express its displeasure. Peter Taksoe-Jensen, spokesman for Denmark's Ministry of Foreign

MAJOR TERRITORIAL DISPUTES IN THE ARCTIC

Affairs in Copenhagen, says for years Canada and Denmark have agreed to disagree over the island and he sees it as a friendly dispute.

HANS ISLAND APPEARS HEADED FOR JOINT CUSTODY (2010)

<http://www.nationalpost.com/news/Hans+Island+appears+headed+joint+custody/3796944/story.html>

Canada is likely to have a second land border in the near future — this time with a European country. The 37-year dispute with Denmark over Hans Island, a small, uninhabited knoll located between Ellesmere Island and northern Greenland, is close to being concluded, according to the Danish Defence Minister. Canada and Denmark are co-operating in many areas of Arctic policy, including joint military operations, sledge patrols and search and rescue missions, after signing a memorandum of understanding about developing their capacity in the region together.

RUSSIA AND NORWAY



RUSSIA AND NORWAY RESOLVE ARCTIC BORDER DISPUTE (2010)

<http://www.guardian.co.uk/world/2010/sep/15/russia-norway-arctic-border-dispute>

Russia and Norway today ended a bitter 40-year dispute over their maritime borders and signed a treaty that will allow for new oil and gas exploration in the Arctic region. The agreement lays to rest a long-running Soviet-era row over the Barents Sea. Both countries claimed a 175,000 sq km (67,567 sq mile) zone, about half the size of Germany, situated north of Russia's Kola Peninsula and the Norwegian coast. The treaty divides the disputed area equally between the two countries.

NORWAY, RUSSIA STRIKE DEAL ON ARCTIC BOUNDARY (2010)

<http://www.vancouversun.com/news/Norway+Russia+strike+deal+Arctic+boundary/2962914/story.html>

An unexpected landmark agreement this week between Norway and Russia on where to draw an offshore boundary in the oil-rich Barents Sea heralds a new era of circumpolar peace, says a leading Canadian expert on Arctic affairs. But University of British Columbia professor Michael Byers, author of the Donner Prize-nominated book *Who Owns the Arctic?*, says the surprise Norwegian-Russian deal puts more pressure on Canada, the U.S. and Denmark to resolve their outstanding Arctic territorial disputes at a time when the region's economic opportunities and environmental challenges are coming into sharper focus. "The fact that Moscow has surrendered its claim to half the area is hugely significant. It provides concrete evidence of Russia's willingness to co-operate in the Arctic — even with much weaker states," Byers told Canwest News Service.

RUSSIA'S ARCTIC CHOICE: COOPERATION OR CONFLICT?

<http://www.carnegieendowment.org/publications/index.cfm?fa=view&id=41629>

The Arctic is emerging as the world's next hot spot for oil and gas development. As the melting ice cap opens new shipping lanes and makes it easier to access strategic energy reserves, countries are racing to gain control over the Arctic's abundant natural resources. In a report, Dmitri Trenin and Pavel Baev offer a view from Moscow on what the opening of the Arctic means. While there is a strong desire to compete over the resources in order to meet increasing energy demands, Trenin and Baev argue that all countries—with Russia in a leading role—can benefit more through cooperation.

GLOBAL SANDBOX

Global Sandbox: The Arctic: A Focus For Thematic Based Learning

Eileen Hynes

<http://www.globalsandbox.blogspot.com/>

In many school districts throughout the country children of younger and younger ages are being asked to sit quietly at desks and begin the incredibly complex task of learning to read. Frustrated adults in positions of power make these demands in an effort to improve test scores, but the child is the one who must perform, and the approach seems to be bringing the scores in the wrong direction. Many early childhood advocates would argue that developmental readiness is key to success in reading, and that this development cannot be rushed. At the same time, throughout the country there are scores of well-trained early childhood teachers who understand the importance of readiness. Their classrooms are havens for young learners whose cognitive abilities are growing by leaps and bounds as they learn to work cooperatively, as part of a group, to listen to one another, to organize, sort and classify, to recognize and create their own patterns, to understand the meaning of numbers, and yes, in their own time, give meaning to the lines and squiggles that represent letters and sounds and join them together to form words. Reading is not a separate discipline, and at its best is taught as part of an integrated program. Most importantly these students are receiving the nurturing everyone needs to grow and thrive and learn, without the anxiety and stress of the adult world.

Recently Dr. Richard H. Solomon, the president of the United States Institute for Peace, spoke in Seattle, hosted by the World Affairs Council. Dr. Solomon outlined the major challenges for the United States in the coming decades. He has defined just two of the issues as unmanageable. One is nuclear arms proliferation and the other is climate change. Despite this news, I remain somewhat optimistic because the changes in the Arctic are being watched and studied by scientists worldwide. A single country cannot solve these problems alone; creativity, cooperation, and collaboration are required. Governments and businesses are preparing to use new shipping routes and establishing claims to the oil and mineral wealth soon to be accessible, while environmentalists call for protection of this fragile ecosystem. These issues are in the news, and it is important for teachers to understand their complexities, and to encourage students to look beyond the sound bites. In order to more fully examine the issues in middle school and high school classrooms and for elementary teachers to understand and clarify the comments made by young students, you will need to see the course of events from several different points of view as you undertake a study of the Arctic in your classrooms.

I recently had the privilege to visit Lindsay Eicher's kindergarten at the Valley School in Seattle. Lindsay's classroom is currently transformed into an arctic environment complete with northern lights, an icehouse, and "dress-up" clothes necessary for survival in the colder climate, where the students experience the arctic through a thematic approach to learning. In Lindsay's class academics are introduced through thoughtful games, group reading and discussions, art activities, and science and math projects. Students work in journals which are sketchbooks, a major tool of not just artists, but also naturalists, geographers, and engineers as a way to process their thinking on a daily basis. Lindsay's class study of the Arctic began with her own love of polar bears and expanded to the whole Arctic. Lindsay talked about her students' enthusiasm as they learn about the anatomy of the polar bear, and experiment with the insulating properties of blubber, actually feeling the difference by submerging their own hands in a bucket of ice water, with and without a glove filled with vegetable shortening. Working together, they also construct models of icehouses. When asked about her approach to complex issues around global warming, Lindsay didn't hesitate: "I want them to know about the environment and to care about it without politicizing it." The action of a concerned adult can be to inspire a love and respect for the world and all living things. As these young people grow up they will have these resources to draw on. And for now they are gaining a strong foundation in geography, science, language arts, and mathematics as they learn in this child-centered, supportive community.

Please share with me a thematic approach that you use. I would love to hear from you and perhaps share your ideas.



Lindsay Eicher's classroom ice house



BOOKS ON THE ARCTIC



WHO OWNS THE ARCTIC? UNDERSTANDING SOVEREIGNTY DISPUTES IN THE NORTH, BYERS, MICHAEL

<http://www.foreignaffairs.com/articles/66100/michael-byers/who-owns-the-arctic-understanding-sovereignty-disputes-in-the-no>

Even though it will take years for the melting of the Arctic ice sheets to trigger widespread coastal flooding, other effects have already appeared: warming in the region has ignited a scramble by neighboring states for resources and ownership. Byers, a Canadian scholar of international law, surveys the emerging lines of conflict, focusing on territorial and sovereignty disputes.

THE FUTURE HISTORY OF THE ARCTIC: A BALANCED LOOK, EMMERSON, CHARLES

http://seattletimes.nwsources.com/html/books/2011381503_br19arctic.html?prmid=head_more

Often overlooked and mostly unknown for much of human history, the Arctic has recently started to emerge from its cloak of anonymity. It has become an important source of oil and natural gas not only for the United States but also for Norway, Russia, and Canada. It is front and center in the debate and the scientific studies over global warming. And, if the climate continues its warming trend, the Arctic may become an important trade route as ships ply the Northwest Passage, a Northeast Passage, or possibly a Trans-Polar Route directly across the North Pole. Emmerson, a geopolitical specialist who was the associate director of the World Economic Forum, takes a broad approach to reporting on the Arctic. As his title implies, he focuses on the region's history — particularly how the Arctic nations have used the area's resources — to understand how past ideas frame the future. And as one can imagine, those ideas vary drastically, from symbol of national identity to source of wealth to homeland, potentially driving many different outcomes.

AFTER THE ICE: LIFE, DEATH, AND GEOPOLITICS IN THE NEW ARCTIC, ANDERSON, ALUN

http://www.amazon.com/After-Ice-Death-Geopolitics-Arctic/dp/0061579076/ref=sr_1_17?ie=UTF8&qid=1291835631&sr=8-17

Anderson, a biologist and former editor in chief for *New Scientist*, was thrilled to see his first polar bear on his first trip to the High Arctic, until a colleague pointed out that the bear was starving to death. Endangered polar bears are emblematic of the drastic changes under way in the Arctic, but there are many more stories to tell about this land in flux. Anderson traveled far and wide, speaking with reindeer herders, hunters, and dozens of experts in diverse fields, piecing together the most panoramic picture yet of this crucial region. Delving into Arctic history, he offers fresh insights into the traditions of indigenous people and the consequences of Arctic exploration, colonization, exploitation, and pollution; and he is equally adept at parsing the growing international scramble for the Arctic's oil, gas, and minerals. With measurements from satellites and submarines quantifying the rapid shrinking of Arctic ice, Anderson joins the call to reduce carbon emissions to slow global warming. Inquisitive, cogent, and compelling, Anderson shares his findings, concerns, and fascination with this vulnerable "place of profound and diverse beauty."

BOOKS ON THE ARCTIC



ARCTIC FOX: LIFE AT THE TOP OF THE WORLD, HAMILTON, GARRY

http://www.amazon.com/Arctic-Fox-Life-Top-World/dp/1554073413/ref=sr_1_3?ie=UTF8&qid=1290454777&sr=8-3

The cover of this book sells it: a small fur ball of a white fox, gazing at the viewer with black shoe-button eyes as he stands on a wind-whipped ice floe. The reader's immediate question—how can such a cute animal survive in such a harsh environment?—is amply explained in this marvelous new study of an animal few of us have ever seen outside the pages of a magazine. Arctic foxes are sublimely adapted for life in the polar region, possessing a fur coat that no other animal can match in terms of insulating properties and covering even the soles of their feet. Arctic foxes are ubiquitous around the North Pole, having been found on every land mass and even on the permanent polar ice. Journalist Hamilton covers the ecology and life cycle of this little fox, which has conquered one of the planet's most extreme climates.

A COMPLETE GUIDE TO ARCTIC WILDLIFE, SALE, RICHARD AND PER MICHELSEN

http://www.amazon.com/Complete-Guide-Arctic-Wildlife/dp/155407178X/ref=sr_1_8?s=books&ie=UTF8&qid=1291917785&sr=1-8

This field guide to Arctic wildlife is a thorough examination of the territory, with emphasis on habitat. In the introductory pages, the author defines the region and then discusses its geology, climate (including such unique phenomena as aurora borealis, parhelia, mirages, ice blink, water sky, and whiteout), exploration, and habitats and what it takes for organisms to survive the harsh conditions. The introduction concludes with a look at threats, including global warming.

ARCTIC LABYRINTH: THE QUEST FOR THE NORTHWEST PASSAGE, WILLIAMS, GLYN

http://www.amazon.com/Arctic-Labyrinth-Quest-Northwest-Passage/dp/0520266277/ref=sr_1_4?s=books&ie=UTF8&qid=1291918833&sr=1-4

The elusive dream of locating the Northwest Passage—an ocean route over the top of North America that promised a shortcut to the fabulous wealth of Asia—obsessed explorers for centuries. While global warming has brought several such routes into existence, until recently these channels were hopelessly choked by impassible ice. Voyagers faced unimaginable horrors--entire ships crushed, mass starvation, disabling frostbite, even cannibalism--in pursuit of a futile goal. In *Arctic Labyrinth*, Glyn Williams charts the entire sweep of this extraordinary history...

ARCTIC CROSSING: ONE MAN'S 2,000 MILE ODYSSEY AMONG THE INUIT, WATERMAN, JONATHAN

http://www.amazon.com/Arctic-Crossing-000-Mile-Odyssey-Among/dp/1585747300/ref=sr_1_4?s=books&ie=UTF8&qid=1291923471&sr=1-4

When Jonathan Waterman set out to cross the Arctic Circle by way of kayak, cross-country skis, and a dogsled, he was less interested in conquering the 2,200 miles between the Pacific and Atlantic oceans than in learning to live as the Inuit had before him (*Inuit*, for *The People*, is the name Canadian Eskimos prefer). Good thing, for the Arctic, as revealed in this candid and engrossing travelogue, is no place for jock-style adventure. Over the course of three summers, Waterman paddled through storms, capsized in 39-degree water, blacked out, and was bitten by thousands of mosquitoes, smoked out by exploding underground seams of coal, and chased by a grizzly bear....

BOOKS ON THE ARCTIC

THE LAST POLAR BEAR: FACING THE TRUTH OF A WARMING WORLD, KAZLOWSKI, STEVEN

http://www.amazon.com/Last-Polar-Bear-Facing-Warming/dp/1594850593/ref=sr_1_11?s=books&ie=UTF8&qid=1291924007&sr=1-11

"Remarkably, Kazlowski manages not only to present a pretty picture of a photogenic animal in a starkly beautiful landscape, but also convey a great deal of information about the polar bears as a species... This beautiful, well-written photo essay book is well worth the time to peruse its pages, both for its insights into one of the world's most magnificent animals, and for the knowledge of the challenge it faces."

BOOKS FOR YOUNG READERS

OVER IN THE ARCTIC: WHERE THE COLD WINDS BLOW, BERKES, MARIANNE AND JILL DUBIN

http://www.amazon.com/Over-Arctic-Sharing-Nature-Children/dp/1584691107/ref=sr_1_1?s=books&ie=UTF8&qid=1292368126&sr=1-1

Marianne Berkes introduces the arctic habitat and its animals in a fun sing-song format that will engage babes in arms, young readers, AND their adult caregivers. In addition to learning about the arctic, kids can practice counting skills and learn about the ways we name baby animals. (Did you know that baby rabbits are called leverets?) The end of the book provides a special treat as we learn that each page hides another arctic species, which parent and child can seek together. Content pages complete the book with information about the arctic tundra and about all 20 animal species featured.

LIVING IN THE ARCTIC, FOWLER, ALLAN

http://www.amazon.com/Living-Arctic-Rookie-Read-About-Geography/dp/0516270842/ref=pd_sim_b_5

The popular Rookie Books expand their horizons—to all corners of the globe! With this series all about geography, emergent readers will take off on adventures to cities, nations, waterways, and habitats around the world...and right in their own backyards.

AMAZING ARCTIC ANIMALS, GLASSMAN, JACKIE AND LISA BONFORTE

http://www.amazon.com/Amazing-Arctic-Animals-Aboard-Science/dp/044842844X/ref=pd_bxgy_b_text_b

Kindergarten-Grade 3-A brief overview of "one of the chilliest places on Earth." The chapters on animals are organized by land, sea, and air, and the book culminates with a section on springtime in the Arctic. The information about each creature includes the term for its young, size at birth and full grown, food, and enemies. The polar bear, arctic fox, arctic hare, muskox, arctic wolf, ringed seal, walrus, beluga whale, ptarmigan, snowy owl, gyrfalcon, caribou, and arctic tern are all introduced. The book does not include a table of contents, index, or glossary, which makes it difficult to use for reports, but beginning readers will enjoy reading it in its entirety or browsing to identify specific animals. t. An appropriate purchase for those looking for easy-to-read animal titles or books on the far North.

BOOKS ON THE ARCTIC

THE POLAR BEAR SON: AN INUIT TALE, DABCOVICH, LYDIA

http://www.amazon.com/Polar-Bear-Son-Inuit-Tale/dp/0395975670/ref=pd_sim_b_3

A whimsical tale in which an old Eskimo-Inuit woman adopts an orphan polar bear cub that provides food for her as it grows up. When the men of the village grow jealous of the animal's superior hunting ability and decide to kill it, she sends it away. For years afterward, she walks far out on the ice and meets the bear, who brings her salmon and seal. The story gives a picture of motherly love toward an "adopted child," one the woman will love always.

ARCTIC LIGHTS, ARCTIC NIGHTS, MILLER, DEBBIE S., AND JON VON ZYLE

http://www.amazon.com/Arctic-Lights-Nights-Debbie-Miller/dp/0802796362/ref=pd_sim_b_3

Miller, a resident of Fairbanks, Alaska, explains the peculiarities of light and seasons near the Arctic Circle and briefly introduces some of the animals that live in the area. Text at the top of each page carries a date ("June 21," "July 21," and so on through a year); the hours of daylight; the time of sunrise and sunset; and the average temperatures. Below, a double-page painting shows a scene in the natural world, typically accompanied by one short paragraph commenting on what is happening and another discussing the length of day and night as well as natural phenomena, such as "sun dogs." The realistic paintings often focus on animals within a landscape. The book concludes with an unusually good glossary that describes phenomena and terms such as *alpenglow*, *flat light*, and *vernal equinox*.

IN ARCTIC WATERS, CRAWFORD, LAURA AND BEN HODSON

http://www.amazon.com/Arctic-Waters-Laura-Crawford/dp/1934359343/ref=pd_rhf_shvl_1

This cumulative tale introduces six animals, beginning with a small fish and ending with a grouchy-looking polar bear. The story builds as each creature is chased by a slightly larger one. When a man (a rosy-cheeked Inuit with harpoon in hand) appears on their ice chunk, the animals have a stroke of good luck: the ice splits in two, separating them from the hunter. The rhyming text is fast-moving and fun. However, the animals' interaction is poorly defined; neither the text nor the illustrations clarify whether the animals are playing with or hunting one another. Cartoon facial expressions range from gleeful to panic-stricken. The depiction of the Inuit hunter is somewhat stereotypical. In addition, the six animals, along with the man and his sled dog, are pictured together on one ridiculously small piece of ice. A four-page information section provides basic facts about each of the animals featured, the Inuit, and Arctic waters in general. A cut-and-color activity and Web address are also included.

THE ARCTIC HABITAT, ALOIAN, MOLLY AND BOBBIE KALMAN

http://www.amazon.com/Arctic-Habitat-Introducing-Habitats/dp/0778729818/ref=pd_sim_b_4

An Arctic Habitat provides an introduction to this cold, vast region, and help children learn about this unique habitat and how the plants and animals have adapted to the harsh environment.

BOOKS ON THE ARCTIC

THE TOP AND BOTTOM OF THE WORLD, FOWLER, ALLAN

http://www.amazon.com/Bottom-World-Rookie-Read-About-Science/dp/0516261606/ref=pd_sim_b_7

From friendly dolphins to giant pandas, from icebergs and glaciers to energy from the sun, from magnets to solids, liquids, and gases, Rookie Read-About Science is a natural addition to the primary-grade classroom with books that cover every part of the science curricula. Includes: animals, nature, scientific principles, the environment, weather, and much more!

BUILDING AN IGLOO, STELTZER, ULLI

http://www.amazon.com/Building-Igloo-Ulli-Steltzer/dp/0805063137/ref=pd_sim_b_9

Armed with a camera and a keen eye, Steltzer went hunting in the Northern Arctic and captured on film a father-and-son team engaged in the ancient and fascinating Inuit art of igloo building. Each turn of the page reveals another step in the process, from pacing off a circle to the secret of the sturdy design (the blocks of snow are placed in an ascending spiral) as well as the finishing touches—such amenities as a window made of ocean ice and a "porch" for storage space. The crisp lines of snow and shadow are enhanced rather than diminished by Steltzer's medium (black-and-white photography); linked with the lean but informative prose, the end result is dramatic in its simplicity. Ages 5-8.

THE INUIT, SANTELLA, ANDREW

http://www.amazon.com/Inuit-True-Books-American-Indians/dp/0516273191/ref=pd_sim_b_9

Ideal for today's young investigative reader, each A True Book includes lively sidebars, a glossary and index, plus a comprehensive "To Find Out More" section listing books, organizations, and Internet sites. A staple of library collections since the 1950s, the new A True Book series is the definitive nonfiction series for elementary school readers.

THE INUIT THOUGHT OF IT: AMAZING ARCTIC INNOVATIONS (WE THOUGHT OF IT), IPELLIE, ALOOTOOK AND DAVID MCDONALD

http://www.amazon.com/Inuit-Thought-Amazing-Arctic-Innovations/dp/1554510872/ref=pd_sim_b_10

Today's Arctic communities have all the comforts of modern living. Yet the Inuit survived in this harsh landscape for hundreds of years with nothing but the land and their own ingenuity. Join authors Alooook Ipellie and David MacDonald as they explore the amazing innovations of traditional Inuit and how their ideas continue to echo around the world. Some inventions are still familiar to us: the one-person watercraft known as a kayak retains its Inuit name. Other innovations have been replaced by modern technology: slitted snow goggles protected Inuit eyes long before sunglasses arrived on the scene. And other ideas were surprisingly inspired: using human-shaped stone stacks (Inunnguat) to trick and trap caribou. Many more Inuit innovations are explored here, including: Dog sleds, Kids' stuff, Shelter, Food preservation, Clothing, Medicine. In all, more than 40 Inuit items and ideas are showcased through dramatic photos and captivating language. From how these objects were made, to their impact on contemporary culture, *The Inuit Thought of It* is a remarkable catalog of Inuit invention.

BOOKS ON THE ARCTIC

POLAR BEARS, SQUIRE, ANN O.

http://www.amazon.com/Polar-Bears-True-Books-Squire/dp/0516255843/ref=pd_sim_b_9

Ideal for today's young investigative reader, each A True Book includes lively sidebars, a glossary and index, plus a comprehensive "To Find Out More" section listing books, organizations, and Internet sites. A staple of library collections since the 1950s, the new A True Book series is the definitive nonfiction series for elementary school readers.

FACE TO FACE WITH POLAR BEARS, ROSING, NORBERT AND ELIZABETH CARNEY

http://www.amazon.com/Face-Polar-Bears-Animals/dp/1426305486/ref=pd_sim_b_1

You're bundled against the Arctic chill. You're loaded with equipment. And that big white bear who's just slashed your tires has a toothache. Where is that helicopter? Norbert Rosing leads young readers into the wintry world of the dangerous polar bear, who has good reason to be angry at man's intrusions. Let this *National Geographic* expert show you the bears' playful side; learn how they make nests for hibernation, why their coats are so white, and how you can help to protect their environment from the effects of global warming.

ARCTIC BABIES, KATHY AND TARA DARLING

http://www.amazon.com/Arctic-Babies-Books-Young-Readers/dp/0802775047/ref=sr_1_26?s=books&ie=UTF8&qid=1292444354&sr=1-26

K-3. Two appealing introductions to distinctive regions of the world. Each double-page spread presents information about an animal baby, designates the area in which it lives, and includes vital facts such as birth weight, food, and natural enemies. The text is written in clear and simple language. End notes explain the different types of arctic habitats and the layers of tropical rain forests. The books' main selling point, however, is the engaging full-color photographs that provide a close-up look at each animal. Collections could benefit from both titles, although Arctic Babies covers an environment that is not frequently encountered in children's books.

GLOBAL WARMING, SIMON, SEYMOUR

http://www.amazon.com/Global-Warming-Seymour-Simon/dp/0061142506/ref=sr_1_1?s=books&ie=UTF8&qid=1294696451&sr=1-1

Simon's consistently high-quality collaborations with the Smithsonian investigate all manner of science topics for young readers, and here take on the timely matter of climate change. Informative and non-condescending, this boils down large, complex issues into understandable concepts, even as it covers the range of current understanding on how we are impacting the planet. Simon distinguishes between weather and climate and offers a succinct explanation of the greenhouse effect and the dangers of rising levels of greenhouse gas emissions. Without being alarmist, he also explains how even a rise of a few inches in sea level could flood populated areas and touches on how the animal world, from butterflies to polar bears, is being impacted. Grades 3-5

VIDEOS ON THE ARCTIC



ARCTIC PASSAGE

<http://www.pbs.org/wgbh/nova/arctic/>

This NOVA program on the Arctic shows two different expeditions to attempt to find a Northwest Passage. The main webpage features video clips, activities, a teacher's guide, and other great resources.



NATIONAL GEOGRAPHIC: MASTERS OF THE ARCTIC ICE

<http://www.shoppbs.org/product/index.jsp?productId=2835060>

The Arctic is the largest expanse of frozen water on the planet. All creatures that make their home there are masters of survival, superbly adapted to the Arctic ice. But climate change has begun to eat away at the ice on which these creatures depend. Two teams of researchers are racing to find out how global warming is rocking the Arctic world before there's nothing left but water.



KEEPING WARM IN THE ARCTIC: HOW TO BUILD AN IGLOO

<http://www.educationalvideos.com/how-to-build-an-igloo/>

When you are living in the Arctic, and all you can see for miles and miles are snow and ice, it's probably only natural that you build your house about the material that's most easily available! That's exactly what an igloo is. A house made of snow and ice. The Inuit people in Iceland and Greenland build these snow-houses from blocks of ice. Igloos can be temporary, small permanent or large permanent dwellings for families of up to three people. Igloos are kept warm by the warmth generated by the people living inside and if built right, can conserve heat extremely efficiently.



POLAR BEARS MAKE A DIFFICULT DECISION

<http://www.pbs.org/wnet/nature/episodes/arctic-bears/polar-bears-make-a-difficult-decision/782/>

For younger students: As Arctic winters warm, polar bears are faced with a troubling situation.



ARCTIC MELT CAUGHT ON VIDEO

<http://news.discovery.com/videos/news-arctic-melt-caught-on-video.html>

Greenland's Petermann Glacier is poised to lose a Manhattan-sized chunk, and the Nares Strait was ice-free all year for the first time, according to Greenpeace. Jorge Ribas reports.



WALRUS FEEL THE HEAT OF ARCTIC ICE MELT

<http://www.cbsnews.com/video/watch/?id=6894245n>

Record high temperatures and prematurely melting Arctic sea ice are threatening the survival of the Pacific walrus and forcing tens of thousands of them to come ashore in Alaska because there are no ice floes.

STEM LESSON PLANS ON THE ARCTIC AND GLOBAL WARMING



INTEGRATING STEM TOPICS INTO YOUR TEACHING



Global Classroom supports the Washington STEM Initiative which seeks to improve student achievement and opportunity in areas critical to our state's economic prosperity: Science, Technology, Engineering, and Mathematics (STEM). The Initiative aims to catalyze innovation in the state's K-12 education system, increase teacher effectiveness and student learning, and dramatically raise the number of Washington students graduating ready for college and work and succeeding in STEM degree programs. These efforts are intended to benefit every student in the state, with a particular emphasis on accelerating the achievement of low-income and minority students.

Below are resources that might help you integrate STEM into your into your humanities/social studies classroom. We encourage you to pass these suggestions on to your colleagues in other subject areas. All of the resources below incorporate STEM into their lesson plans.



INTRODUCTION TO EARTH'S DYNAMICALLY CHANGING CLIMATE (FOR TEACHERS)

<http://www.pbs.org/teachers/stem/professionaldevelopment/015/>

How is the Earth's climate changing? Within the mainstream scientific community the fundamentals of global warming and climate change are no longer in question and increasing evidence shows that human activities, such as the burning of fossil fuels, deforestation and land degradation, cattle ranching, and rice farming, play a significant part in contributing to this change. Examine evidence of climate change from different parts of Earth's system and consider what it means to live on a planet with a dynamically changing climate.



EARTH'S WARMING CLIMATE: ARE WE RESPONSIBLE?

<http://www.pbs.org/teachers/stem/professionaldevelopment/010/>

Global climate change is one of the most profound challenges facing humanity today. This lesson provides the evidence that the amount of CO₂ in the atmosphere has not been as high as it is currently for nearly half a million years and that this increase corresponds with data that human activity is responsible. Examine scientific data showing increases in both atmospheric CO₂ and the Earth's average temperature. Analyze changes in atmospheric concentration of CO₂ over time.



ARCTIC ANIMALS AND CLIMATE CHANGE

<http://www.pbs.org/kqed/oceanadventures/educators/arctic/>

Learn about the effects of a changing climate on the Arctic ecosystem and four of its well-known mammals: the polar bear, the walrus, the Arctic fox and the beluga whale. Grades 5-8



ARCTIC CIRCLE

<http://arcticcircle.uconn.edu/VirtualClassroom/>

Resource from the University of Connecticut on natural resources, history, and social issues in the Arctic featuring lesson plans and activities related to the environment, politics, and cultural issues in the Arctic. Although geared toward a college level, these lesson plans could be adapted for high schoolers.

STEM LESSON PLANS ON THE ARCTIC AND GLOBAL WARMING



ARCTIC PASSAGE

http://www.pbs.org/wgbh/nova/teachers/activities/3307_arctic.html

NOVA recreates the expeditions of Sir John Franklin and Roald Amundsen, two Arctic explorers who set out to find the legendary Arctic sea route known as the Northwest Passage. Link includes a teacher's viewing guide for the film and lesson plans/activities for the classroom.

Grades: 5-8, 9-12



ARCTIC SEA ICE AND GLOBAL WARMING

<http://edmall.gsfc.nasa.gov/inv99Project.Site/Pages/trl/inv5-3.html>

In this activity, students will explore the relationship of the rising global temperatures to changes in the freeze and melt patterns of Arctic sea ice. They will demonstrate the ability to summarize data, investigate results and scientific concepts, process information through drawing, written, and/or oral communication, and use tables, graphs, and charts to display data in making oral and written. Grades: 6-8



BEYOND PENGUINS AND POLAR BEARS

<http://beyondpenguins.nsd.org/>

Beyond Penguins and Polar Bears Explore the Arctic and Antarctica; Learn science concepts and literacy strategies; Read about misconceptions, equity, and technology; Discover lessons and unit plans aligned to national standards; Integrate polar science into your curriculum Multimedia resources include podcasts, a photo gallery, and electronic books for student use. Direct link to teaching standards and lesson plans:

<http://beyondpenguins.nsd.org/browse/column.php?departmentid=curriculum&columnid=curriculum!lessons>



CLIMATE CHANGE IN THE ARCTIC OCEAN: POLAR BEAR PANIC!

http://oceanexplorer.noaa.gov/explorations/02arctic/background/education/media/arctic_polarbears.pdf

In this lesson students investigate climate change in the Arctic Ocean to discover the potential impact of observed reduction in sea ice in the Arctic Ocean on ocean life. As a result of this activity, they will be able to identify the three biological realms of the Arctic Ocean and describe the relationships between these realms. Grades: 3-8



DEBATE: SHOULD OIL DRILLING BE ALLOWED IN THE ARCTIC NATIONAL WILDLIFE REFUGE?

http://www.pbs.org/pov/arcticson/lesson_plan.php

This lesson plan is designed to be used in conjunction with the film *Arctic Son*, which captures the lifestyle of Native people (the Vuntut Gwitchin) living above the Arctic Circle in the Canadian Yukon while documenting the reunion of a father and son after a lifetime apart. This lesson asks students to conduct a role-play debate that discusses whether or not oil drilling should be allowed in the Arctic National Wildlife Refuge. Grade: 6-12



DIGITAL LIBRARY FOR EARTH SYSTEM EDUCATION

<http://www.dlese.org/library/query.do?q=arctic&s=0>

The Digital Library for Earth System Education (DLESE) is a distributed community effort involving educators, students, and scientists working together to improve the quality, quantity, and efficiency of teaching and learning about the Earth system at all levels.

STEM LESSON PLANS ON THE ARCTIC AND GLOBAL WARMING



ENVIRONMENTAL ISSUES IN POLAR REGIONS

<http://www.nationalgeographic.com/xpeditions/lessons/05/g912/polarregions.html>

The polar regions are frequently neglected in discussions of the environment, but they shouldn't be. The environment of the polar regions is particularly susceptible to human impacts such as pollution and the depletion of the ozone layer. Moreover, the effects of global warming on the polar regions are likely to have major repercussions in the rest of the world. Students will learn about how environmental problems affect the polar regions, and they will create magazine ads to educate the public about these problems and to convince people to pay more attention to human impacts on the Arctic and Antarctic. Grades 9-12



GLOBAL WARMING

<http://www.pbs.org/now/classroom/globalwarming.html>

Is human activity bringing about alarming global warming scenarios and related catastrophes? Or is such thinking a myth brought about by flawed or incomplete science? Finding the answers to these questions has turned global warming into a highly politicized and contentious issue. Use the NOW Classroom standards-linked lesson on global warming to help students research and form credible opinions. This lesson is designed for social studies, debate, language arts, government/citizenship, and current events classes. Grades 9-12



MEET THE ARCTIC BENTHOS

http://oceanexplorer.noaa.gov/explorations/02arctic/background/education/media/arctic_benthos.pdf

In this lesson students will investigate benthic invertebrate groups in the Arctic Ocean to determine what kinds of animals live there. As they proceed in this activity, they will learn to recognize and identify major groups found in the Arctic benthos, describe common feeding strategies used by benthic animals there, and discuss relationships between groups of animals in Arctic. Grades 6-8



NATURE: FOR TEACHERS: LESSON PLANS: SURVIVAL SKILLS

<http://www.pbs.org/wnet/nature/arcticoasis/lessonplan.html>

Survival in the Arctic demands great skills from the Inuit nation that populates this area. In this lesson, students will learn about the challenges Inuit people face as they attempt to teach their children about the old ways of surviving in an ever-changing world. Students will research the Inuit history and culture and create an in-depth news report based on what they learned about the Inuit Nation. Grades 6-8



NOAA OCEAN EXPLORER: TRACKING NARWHALS IN GREENLAND

<http://oceanexplorer.noaa.gov/explorations/06arctic/background/edu/lessonplans.html>

Educators and scientists working with NOAA developed a series of lessons for students in Grades 5 - 12 that are specifically tied to the science behind the Tracking Narwhals in Greenland Expedition. These lessons focus on cutting-edge ocean exploration and research using state-of-the-art technologies.



ANIMALS OF THE ARCTIC

<http://library.thinkquest.org/3500/>

STEM LESSON PLANS ON THE ARCTIC AND GLOBAL WARMING

The world has many different animals. In the Arctic we have many animals that are unique to the north that we would like to tell you about. We have chosen some of the most unique arctic animals there are. We have stories to read, great pictures of the animals, interesting facts to share, and some fun activities to do.



TRAGEDY OF THE COMMONS

<http://www.enviroliteracy.org/article.php/1160.html>

The "tragedy of the commons" is one of the most important topics in environmental science. Many resources (ex. clean air, biodiversity, fresh water) are available to many people, and when resources are *shared* and *limited* (though potentially renewable), they are often exploited. This is due to the fact that the benefit to one person of using more of the resource outweighs the cost to that individual of the resource's overuse. Each person looks out only for his own interests, and succumbs to the logic that, "If I don't use the resource, then someone else will. I might as well get the benefit." Learning to overcome our natural tendency to overuse common resources is one of the most significant challenges we face in working to improve the environment.



ARCTIC CLIMATE MODELING PROGRAM

<http://www.arcticclimatemodeling.org/>

The Arctic Climate Modeling Program (ACMP) is a research-based weather and climate curriculum for K-12 classrooms. ACMP comprises hands-on, inquiry-based classroom lessons, an interactive multimedia DVD, engaging lectures from Geophysical Institute and International Arctic Research Center scientists, and a Student Network for Observing Weather (SNOW), enabling students around the world to study Alaska's weather.



THE ARCTIC AND ANTARCTIC CIRCLES

<http://www.nationalgeographic.com/xpeditions/activities/05/circles.html>

This website is part of National Geographic's Xpeditions Hall and includes lesson plans and activities related to the topic of the Arctic and Antarctic regions. Students compare and contrast these regions to learn more about the flora and fauna found there, as well as environmental issues facing the polar regions. These lesson plans were written by educators and have been tested in the classroom.



A VACATION TO THE POLAR REGIONS

<http://www.nationalgeographic.com/xpeditions/lessons/05/gk2/polar.html>

In this lesson plan students will learn about the characteristics of the Arctic and Antarctic by looking at a globe and at pictures of the polar landscape and animals. They will plan a vacation to one of these regions and draw pictures or write stories depicting themselves on the trip.



KEEPING WARM WHEN IT IS COLD: HOW DOES A POLAR BEAR KEEP WARM?

<http://tea.armadaproject.org/activity/cook/keepingwarmwhenitiscoldhowdoesapolarb...>

In this activity the students will be making a model of a polar bear and describing the color of the fur and skin to understand why the color is important. Measuring the temperature of a

STEM LESSON PLANS ON THE ARCTIC AND GLOBAL WARMING

black sock and a white sock and comparing temperatures is also included in the activity so that the students can understand the difference in heat retention. ...



CENTER FOR REMOTE SENSING OF ICE SHEETS: K-12 EDUCATION

<https://www.cresis.ku.edu/education/k-12>

The Center for Remote Sensing of Ice Sheets (CRE SIS) provides links to educational materials that focus on topics related to global climate change and remote sensing, particularly changes in continental ice sheets and glaciers in Greenland and Antarctica. K-12 education resources include links to materials (including lesson plans) on ice sheets and glaciers, global climate change, robotics, and mapping and modeling.



ARCTIC THEME PAGE

<http://www.arctic.noaa.gov/education.html>

The Arctic Theme Page is a rich and comprehensive resource linking to widely distributed data and information, from research institutions throughout the world, focused on the Arctic. Available information includes relevant data, graphics, and forecasts, including historical perspectives and in-depth analyses. Also included is a selection of Essays by Arctic experts on key issues in the Arctic. The audience for the Arctic Theme Page is wide, including scientists, students, teachers, decision makers and the general public.



INTERNATIONAL ALLIANCES

<http://www.nationalgeographic.com/xpeditions/lessons/13/g912/eurounion.html>

This lesson can be adapted to include the Arctic Council as one of the organizations students can research. <http://www.arctic-council.org/> In this lesson, students will learn the history, mission, function, and geographical range of six international alliances. They will research opposing viewpoints concerning these alliances and consider the reasons why some people want to reform or disband these organizations. Students will: list the reasons why countries might form alliances with one another; describe some of the things they know about major international alliances; research and answer questions about six international alliances; mark the geographical range of these unions on a world map; and research opposing viewpoints concerning these groups, and present the findings to the class. Grades 9-12

Global Science Fair 2011

<http://www.google.com/events/sciencefair/index.html>

Google is looking for the brightest, best young scientists from around the world to submit interesting, creative projects that are relevant to the world today. The competition is open to students aged 13 to 18 from around the world working on their own or in a team of two or three. For more details, visit the Science Fair Rules page.

Great Prizes include a \$10,000 scholarship, a trip with National Geographic on an expedition to the Galapagos Islands, a customized LEGO set, a subscription to *Scientific American*, an internship with LEGO, and other great prizes.

Submission deadline: April 4, 2011

See the website for more details.

QUESTIONS FOR K-12 DISCUSSION

Written by Eileen Hynes

Questions for discussion based on Washington State's K-12 Social Studies Learning Standards

See: <http://standards.ospi.k12.wa.us/Default.aspx?subject=6%2cGLE>

The student uses a spatial perspective to make reasoned decisions by applying the concepts of location, region, and movement and demonstrating knowledge of how geographic features and human cultures impact environments.

Learn more about Geography Standards here.

<http://www.nationalgeographic.com/xpeditions/standards/index.html>

Grades K-2

Subjects: Families in our community and other places

Questions:

1. If you and your family were to move to the Arctic, what changes would you need to make?
2. Describe your favorite season of the year? Why?
3. Look at a map or globe. Make a path from your city to the Arctic? What countries do you pass through?

Grades 3-5

Subjects: Cultures in our community and throughout the United States

Questions:

1. If you had the opportunity to speak with someone from the arctic what are three questions you would ask?
2. Use the compass points to describe the route from your home to each of the countries with an Arctic border?
3. What is one thing you can do that might impact climate change? Your family? Your school?

Grades 6-8

Subjects: World geography and immigration and migration

Questions:

1. How do you think geographic boundaries in the Arctic will be affected by climate change?
2. In what ways do you think humans' use of the Arctic might change over time?
3. Would you consider living in a different place? Why or why not?

Grades 9-12

Subjects: International conflicts, emergence of new nations, and challenges to human rights and democracy, contemporary global problems

Questions:

1. Use National Geographic Xpeditions Lesson Maps and Current Events to explore issues about the Arctic.
<http://www.nationalgeographic.com/xpeditions/lessons/03/g912/exploremaps.html>.
2. Why are the changes facing the Arctic important to people everywhere?
3. Choose a country in the Arctic and defend its borders

ENVIRONMENTAL RESOURCES IN SEATTLE



CANADIAN STUDIES CENTER (UNIVERSITY OF WASHINGTON)

<http://jsis.washington.edu/canada/>

The Canadian Studies Center is part of the Henry M. Jackson School of International Studies at the University of Washington. It joins with the Center for Canadian-American Studies at Western Washington University in Bellingham to create a federally supported Pacific Northwest National Resource Center on Canada.



PACIFIC SCIENCE CENTER

<http://www.pacsci.org/>

Pacific Science Center inspires a lifelong interest in science, math and technology by engaging diverse communities through interactive and innovative exhibits and programs. Exhibits include: *Science On a Sphere*, which uses computers and video projectors to display dynamic, animated images of the atmosphere, oceans and land on an illuminated sphere six feet in diameter; Sound Atmosphere: NOAA installed a device on top of the Space Needle to track CO² in the atmosphere. Visitors can see how levels of CO² change from morning to evening, from spring to winter and from weekdays to weekends on a monitor at Pacific Science Center; and many other great permanent and temporary exhibits.



CLIMATE SOLUTIONS

<http://www.climatesolutions.org/>

The mission of Climate Solutions is to accelerate practical and profitable solutions to global warming by galvanizing leadership, growing investment and bridging divides. Their regional organizing approach is transforming the global warming debate in the region and laying the groundwork for a successful, multi-stakeholder climate action agenda. They're generating fresh political momentum for energy and transportation solutions that benefit the region's economy and quality-of-life.



AROUND THE AMERICAS

<http://www.aroundtheamericas.org/>

Zeta Strickland, one of the speakers at our program, was part of this expedition that sailed through the Arctic. "Around the Americas is a 28,000 mile sailing circumnavigation of the American continents with the mission of inspiring, educating and engaging the citizens of the Americas to protect our fragile oceans." Check out the website for photos, blogs, and other information about the trip.

EARTHCORPS

<http://www.earthcorps.org>

It is dedicated to building global community through local environmental restoration service. Based in Seattle, EarthCorps consists of volunteer-based and contracted restoration projects on public lands in the Puget Sound and Cascade mountains.



FACING THE FUTURE

<http://www.facingthefuture.org/>

Based in Seattle, they research and write curriculum materials (downloadable for free) that promote critical thinking and meet national education standards; provide professional

ENVIRONMENTAL RESOURCES IN SEATTLE

development training to teachers; and consult with schools to integrate global sustainability issues across their curricula.

PEOPLE FOR PUGET SOUND

<http://www.pugetsound.org>

People for Puget Sound is a citizens' group working to protect and restore the health of Puget Sound and the Northwest Straits through education and action. Their website contains a colorful, interactive guide entitled "10 Things YOU, Yes You, Can Do to Help Puget Sound."

CITY OF SEATTLE: ENVIRONMENT

<http://www.seattle.gov/html/CITIZEN/environment.htm>

This webpage is entirely devoted to local environmental issues.

NORTHWEST ENVIRONMENTAL EDUCATION COUNCIL (NWEEC)

<http://www.nweec.org/>

Northwest Environmental Education Council provides in-school and after-school environmental education programs for youth, training programs for school teachers, training programs for environmental professionals, and service learning programs for all ages that improve environmental quality.

SEATTLE CLIMATE ACTION NOW (SEATTLE CAN)

<http://www.seattlecan.org/>

Seattle Climate Action Now is an exciting effort to give everyone in Seattle the tools needed to start making a real difference at home, at work, and on the road. It will bring you together with people across the street and across town to take action to protect the climate for all of us and for future generations.

SUSTAINABLE SEATTLE

<http://www.sustainableseattle.org/>

Sustainable Seattle is a non-profit organization that promotes sustainability in the Central Puget Sound. Our core work is indicators: you get what you measure. We work with the community to measure and make progress towards sustainability in our natural, built, economic, social and personal environments. Our goals are social justice, collaboration and stewardship.

THE MOUNTAINEERS

<http://www.mountaineers.org/ScriptContent/default.cfm>

The Mountaineers was formed in 1906 to explore the wild areas and peaks surrounding the still-young city of Seattle. The Mountaineers works to ensure that wilderness areas are preserved and protected through the actions of our Conservation, Recreation Resources and Stewardship divisions. Volunteer members track issues, mobilize members, perform trail maintenance, work with coalitions and lobby legislators (local and national).

SIERRA CLUB—CASCADE CHAPTER

<http://cascade.sierraclub.org/>

The local branch of the Sierra Club works throughout Washington with local groups focused on local conservation efforts and state-wide legislative priorities.

MAIN GLOBAL COMPETENCE MATRIX

Global Competence is the knowledge, skills, and dispositions to understand and act creatively and innovatively on issues of global significance.

INVESTIGATE THE WORLD	RECOGNIZE PERSPECTIVES	COMMUNICATE IDEAS	TAKE ACTION
Students investigate the world beyond their immediate environment.	Students recognize their own and others' perspectives.	Students communicate their ideas effectively with diverse audiences.	Students translate their ideas and findings into appropriate actions to improve conditions.
<p>Students:</p> <ul style="list-style-type: none"> Identify an issue, generate a question, and explain the significance of locally, regionally, or globally focused researchable questions. Use a variety of languages and domestic and international sources and media to identify and weigh relevant evidence to address a globally significant researchable question. Analyze, integrate, and synthesize evidence collected to construct coherent responses to globally significant researchable questions. Develop an argument based on compelling evidence that considers multiple perspectives and draws defensible conclusions. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express their own perspective on situations, events, issues, or phenomena and identify the influences on that perspective. Examine perspectives of other people, groups, or schools of thought and identify the influences on those perspectives. Explain how cultural interactions influence situations, events, issues, or phenomena, including the development of knowledge. Articulate how differential access to knowledge, technology, and resources affects quality of life and perspectives. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express how diverse audiences may perceive different meanings from the same information and how that affects communication. Listen to and communicate effectively with diverse people, using appropriate verbal and nonverbal behavior, languages, and strategies. Select and use appropriate technology and media to communicate with diverse audiences. Reflect on how effective communication affects understanding and collaboration in an interdependent world. 	<p>Students:</p> <ul style="list-style-type: none"> Identify and create opportunities for personal or collaborative action to address situations, events, issues, or phenomena in ways that improve conditions. Assess options and plan actions based on evidence and the potential for impact, taking into account previous approaches, varied perspectives, and potential consequences. Act, personally or collaboratively, in creative and ethical ways to contribute to improvement locally, regionally, or globally and assess the impact of the actions taken. Reflect on their capacity to advocate for and contribute to improvement locally, regionally, or globally.

The Global Competence Matrix was created as part of the Council of Chief State School Officers' EdSteps Project in partnership with the Asia Society Partnership for Global Learning.

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GLOBAL COMPETENCE MATRIX FOR SCIENCE

INVESTIGATE THE WORLD	RECOGNIZE PERSPECTIVES	COMMUNICATE IDEAS	TAKE ACTION
Students use science to investigate the world.	Students recognize their own and others' perspectives through the study of science.	Students communicate about science effectively with diverse audiences around the world.	Students use their scientific knowledge and skills to translate their ideas and findings into actions that improve conditions.
<p>Students:</p> <ul style="list-style-type: none"> Identify issues and frame investigable questions of local, regional, or global significance that call for a scientific approach or emerge from science. Use a variety of domestic and international sources to identify and weigh relevant scientific evidence to address globally significant researchable questions. Design and conduct a scientific inquiry to collect and analyze data, construct plausible and coherent conclusions, and/or raise questions for further globally significant study. Interpret and apply the results of a scientific inquiry to develop and defend an argument that considers multiple perspectives about a globally significant issue. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express their own perspective on situations, events, issues, or phenomena, and determine how that perspective along with their entire understanding of the world is influenced by science. Examine scientific ways of knowing and perspectives about science of other people, groups, and schools of thought, and identify the influences on those perspectives. Explain how cultural interactions influence the development of scientific knowledge. Explore and describe the consequences of differential access to scientific knowledge and to the potential benefits of that knowledge. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express how diverse audiences may interpret differently and/or make different assumptions about the same scientific information and how that affects communication and collaboration. Use varying scientific practices, behaviors, and strategies to verbally and non-verbally communicate scientific information effectively with diverse audiences, including the international scientific community. Select and use appropriate technology and media to communicate about science and share data with experts and peers around the world. Reflect on how effective communication affects scientific understanding and international collaboration in an interdependent world. 	<p>Students:</p> <ul style="list-style-type: none"> Identify and create opportunities in which scientific analysis or inquiry can enable personal or collaborative action to improve conditions. Assess options, plan actions, and design solutions based on scientific evidence and the potential for impact, taking into account previous approaches, varied perspectives and potential consequences. Act, personally or collaboratively, in creative and ethical ways to implement scientifically-based solutions that contribute to sustainable improvements, and assess the impact of the action. Reflect on how scientific knowledge and skills contribute to their capacity to advocate for improvement locally, regionally, or globally.

Global Competence is the knowledge, skills, and dispositions to understand and act creatively and innovatively on issues of global significance. The global competence matrices help explain Global Competence and how to apply it. They were created as part of the Council of Chief State School Officers' EdSteps Project, in partnership with the Asia Society Partnership for Global Learning.

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GLOBAL COMPETENCE MATRIX FOR SOCIAL STUDIES

INVESTIGATE THE WORLD	RECOGNIZE PERSPECTIVES	COMMUNICATE IDEAS	TAKE ACTION
Students investigate the world beyond their immediate environment.	Students recognize and understand their own and others' perspectives.	Students communicate their ideas effectively with diverse audiences.	Students translate their ideas and findings into appropriate actions to improve conditions.
<p>Students:</p> <ul style="list-style-type: none"> Identify issues and frame researchable questions of local, regional, or global significance that call for or emerge from investigations in the social sciences, Identify and weigh relevant evidence from primary and secondary documents, using a variety of domestic and international sources, media, and languages, to address globally significant researchable questions. Analyze, integrate, and synthesize evidence using knowledge, methods, and critical skills in the social sciences to deepen their understanding of and construct coherent responses to globally significant issues. Produce an account based on compelling social scientific evidence and multiple perspectives that exhibits understanding of a global issue and that raises new questions and/or advocates for action. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express their own perspective on situations, events, issues, or phenomena, and identify the cultural, social, economical, political, geographical, and historical influences that inform that perspective. Examine the role of place, time, culture, society, and resources in the perspectives held by people, groups, and/or schools of thought. Explain how individuals, societies, events, and the development of knowledge are influenced by the movement and interaction of ideas, goods, capital, and people. Explore and describe how geopolitical differences, as well as access to knowledge, resources, and technology, affect the options, choices, and quality of life of people around the world. 	<p>Students:</p> <ul style="list-style-type: none"> Recognize and express how diverse audiences may interpret and use the same information in different ways and for different purposes and how that affects communication and collaboration. Use the language of social scientists and adapt their modes of communication and behavior to interact effectively with diverse audiences. Select and use technology and media strategically to create products, express views, and communicate and collaborate with people of diverse backgrounds. Reflect on how communication contributes to or impedes understanding, collaboration, negotiation, and diplomacy in an interdependent world. 	<p>Students:</p> <ul style="list-style-type: none"> Identify and create opportunities for personal and collaborative action and civic engagement to contribute to sustainable improvements and quality of life. Assess options, plan actions, and engage in civil discourse, considering previous approaches, varied perspectives, political viability, and potential consequences. Act, personally and collaboratively, in ways that are creative, ethical, and informed by the knowledge and methods of the social sciences to contribute to sustainable improvement, and assess the impact of the action. Reflect on their capacity to draw on the social sciences to advocate for and contribute to improvement locally, regionally, or globally.

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