

IPY Resources for Teachers

Office of Polar Programs



IPY Session: Polar Science Resources for Teachers

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We are at the midpoint of IPY and many resources are appearing or being refined. If you are hoping to teach about polar science and related topics, here are some links to guide you.

<http://www.google.com>

Familiar, comfortable; easy to use with extensive results – but, best resources are often missed.

You will find many, many site – often specialized and not overtly targeted for classroom use. You need to be a polar expert to select the best search terms!



The remainder of the list is not comprehensive by any means – the scope is broad; but all seem to be useful for teachers. Notes are included about the reason each site in included.

The following criteria are used for site evaluation.

Accuracy – reliable source, free from error.

Authority – author is named on site, credentials are available, publisher is reputable.

Objectivity – Information is free of bias or non-controversial (except when explicitly stated – no hidden agenda), statements represent both sides.

Currency – Information is up-to-date, updates are identified (for historical data, check for copyright date – that way you know someone is paying attention to the site, even if the information is static)

Coverage – topics are thoroughly and adequately covered; breadth and depth is sufficient for website's purpose.

Key Areas of Study for IPY

Environmental Status – assessing status and change in polar regions

Quantifying Change – understanding past and predicting future

Global Linkages – links between global and local processes

New Frontiers – science exploration in the polar regions

Unique Vantage Point – observing earth and space from the poles

Human Dimensions – sustainability of circumpolar societies

The organizations and agencies –

These are the websites from the major agencies and organizations involved in IPY efforts. Their scope is much broader than educational resources, although they are an excellent source of those, too.



<http://www.ipy.gov>

The US home for IPY information, activities and resources. The “Explore & Learn” link on the left sidebar will direct you to educational materials.



<http://www.ipy.org>

The international home for IPY information, activities, and resources. It is the “same but different” as the US site. Lots of routes to educational materials on the home page.



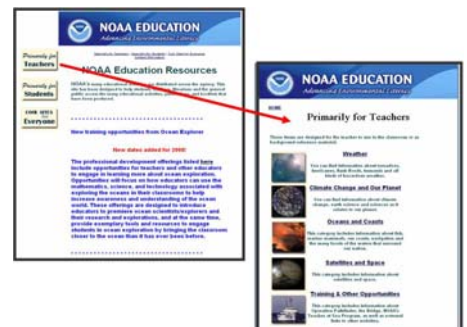
<http://www.nsf.gov>

Not an obvious resource page for teachers, but there is a wealth of information here, not just for IPY! Educators should look for the “Classroom Resources” item on the right sidebar and that page will let them refine their search. The news items are also great for informing students on latest and breaking research in many areas.



<http://www.noaa.gov>

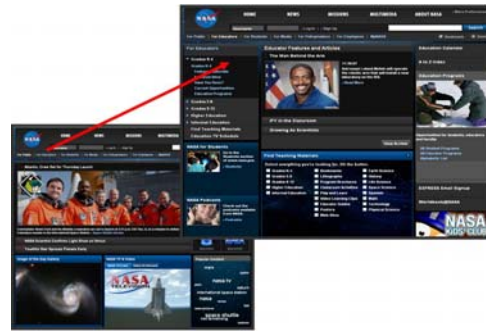
There are a lot of teacher resources at NOAA. The quickest way to IPY specific materials is to enter “IPY” in the search space.





<http://www.nasa.gov>

NASA's education portfolio is accessed by the menu item "For Educators". Faster still is to use the link: <http://www.nasa.gov>

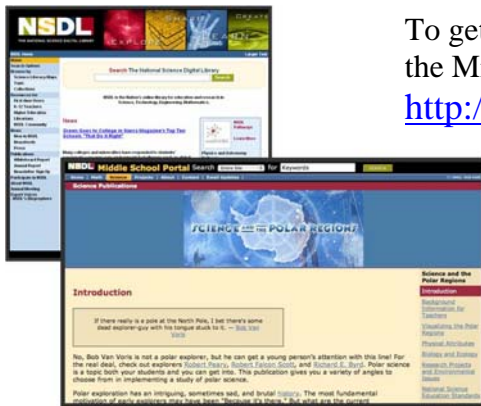
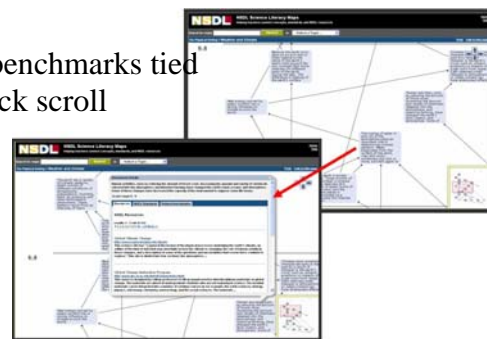


If you were going to remember only one or two resources – these are the ones! Their polar collections are fabulous, and both are rapidly evolving into the place to go for all educational resources.



<http://www.nsd.org>

With literacy maps and benchmarks tied to the materials via a quick scroll and mouse click, NSDL is becoming indispensable for the science educator. This link is to the whole house!



To get to a polar science collection aimed at the middle grades, use the Middle School Pathway Portal link: <http://msteacher.org/epubs/science/science23/science.aspx>

An extraordinary collection targeted directly at the K-5 set (but much is of worth and adaptable to older students) go to: <http://beyondpenguins.nsd.org>.

Sign up for the 'email updates' and be on a fast track to the latest news in polar science.



<http://www.teachersdomain.org>

If you haven't been there lately, be sure to check out the upgrades to this PBS site. It is free to join, has excellent resources (tied to specific state standards in most cases), and most materials are fair use and/or copyright free.



There is a Polar Science Special Collection at <http://www.teachersdomain.org/exhibits/ipy07-ex/>



Sites specifically targeted to polar science.



<http://www.polartrec.com>

Polar research from the participants' view. Many journal and blogs from teacher researchers and scientists. Even if you are not able to go physically on a trek, travel virtually through the archives, or participate in a webcast from the poles.

<http://www.andrill.org>

Antarctic Drilling program looks at geology and paleontology of the Antarctic region via sediment cores. Project Iceberg is the gateway for educators and directs you to a variety of resources. Flexhibit was designed as an activity for 4-H and similar after-school programs,



but many of the ideas are transportable to your classroom. It would be great for a science club to develop as a community outreach event!





<http://passportknowledge.com/polar-palooza>

A remarkable site that has wonderful video podcasts from 'real' polar scientists talking in 'real' language to 'real' people. If the live tour comes near you, it is worth seeing – at the very least read the bios of the people involved. It's another insight to polar studies.



<http://www.ipyroam.org>

From the above site, select “outreach” and read the blog of this group of multi disciplinary undergrads, grad students, K-12 teachers, and university faculty’s Dec 07/Jan 08 trip to Antarctica. The blog could make a good mini-text or primer about Antarctica research. (you can view Dr. Tweedie’s presentation materials from an NSTA IPY Symposium presentation at http://learningcenter.nsta.org/products/symposia_seminars/fall07/IPY_Birmingham/symposium_post.aspx



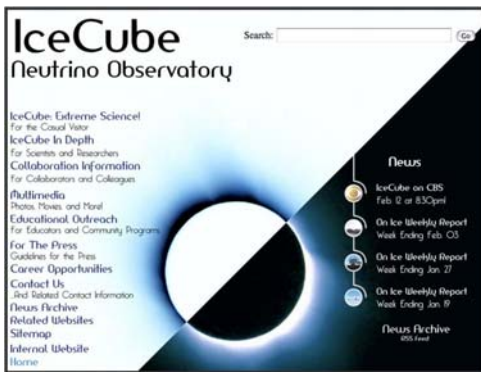
<http://www.crisis.ku.edu>

Wonderful resource for sea ice information. It does not ‘rise to the top’ in Google! Resources and accessibility for K-12 educators has been greatly improved in the last year, so it might deserve a revisit if it’s been awhile since you looked.



<http://www.exploratorium.edu/poles/index.php>

A 2008 Webby Award Honoree for best Science Ice Stories presents and archives ‘dispatches from polar scientists.’ Nice link to the South Pole Telescope and other materials, too.



<http://icecube.wisc.edu>

This is the homepage for the Ice Cube Neutrino Observatory. Many of the sidebar choices, besides the Educational Outreach, are very for many students. This easily addresses the IPY Key area of New Frontiers, and Unique Vantage Points and can slip polar science into those classes that don't deal with the earth/geo/environmental areas.



<http://www.educapoles.org>

This is the educational site for the International Polar Foundation. The teaching units provided tend to be for higher level/grades than most of the other site. It is not extensive, but it is very good.



<http://www.penguinscience.com>

Penguin Science has lots of multimedia activities and many ways for students to become actively involved in scientific research.



<http://polardiscovery.whoi.edu>

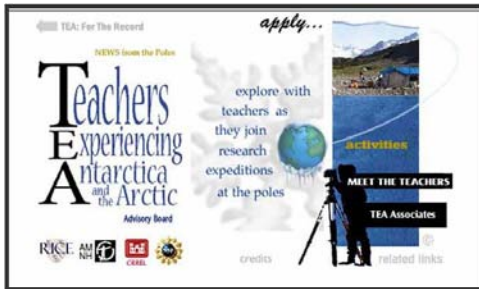
A Woods Hole Oceanographic Institute site for their current expeditions. Good background, moderately interactive features (great graphic of the arctic ocean currents) and a variety of other resources.



<http://www.crrel.usace.army.mil>

The US Army's Cold Regions Research and Engineering Laboratory's site. Under the Educational Outreach menu item, you will find student opportunities (high school and above). The Kid's Corner is not directly polar related, but there are some good activities (especially under the Navigation Lessons) to tie in with a polar topic unit.

Older sites focused on polar studies, but still lots of good, usable information



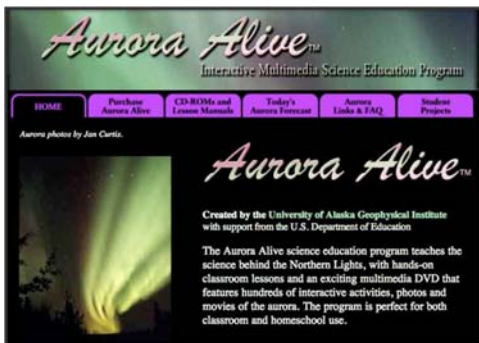
<http://tea.armadaproject.org/>

This is the archive for the lesson plans and related materials for the TEA project. It is no longer active, although the parent ARMADA project is still underway. It is easier to link to it from this archive than it is to get to the TEA resources from ARMADA!.



<http://www.arcticice.org>

This site is no longer active, but it has some good graphics and language that are especially usable with upper elementary students.



<http://www.auroraalive.com>

This commercial site has some great free resources, too. Good FAQs and downloadable lessons make it worth a look. Students are intrigued by the aurora and this provides a good slide from cosmology to other polar studies.




<http://www.antarctica.uab.edu>

An Antarctica expedition by the University of Alabama at Birmingham. The blogs are informative and the photos are great. The captions make them fun and very usable in the classroom



<http://www.elasticthinking.org>

This is a commercial advocacy site from Australia that has some merit in the links and the videos. Unfortunately, the videos sometimes load, and sometimes don't; too bad, because they are very good (Recent trials have been more successful on a Mac than a PC). The target for this might be a stewardship or ethics discussion with upper middle or high school students. It's worth a look, even though it is an older site.



Teachers' Guide to High Quality Educational Materials on Climate Change and Global Warming

This guide points K-12 educators to the best sites for teaching about climate change: several that offer first rate **background material**, and others that include detailed **lesson plans** and experiments. It begins with **Top Ten Things You Need to Know about Global Warming** and a note about why there is so much controversy surrounding this issue.

Climate change is a great topic for students to study because it integrates so many subjects: energy, environment, geography, politics, chemistry, biology, economics, and more. It requires students to use analytical tools and math skills, and to exercise their abilities to research, think and understand complex issues. The **web sites** reviewed in this guide offer everything you need to create your own unit on climate change and global warming.

<http://hdgc.epp.cmu.edu/teachersguide/teachersguide.htm#topten>

Teachers' Guide to High Quality Educational Materials on Climate Change and Global Warming. Lots of excellent resources – but if you picked only one, use the 'Top Ten' list!



Join WWF | Member Login | Take Action | Donate Now

DISCOVER > Global Forces > Climate Change > Climate Curriculum for Teachers

Climate Curriculum for Teachers

Your Climate, Your Future
An interdisciplinary approach to incorporating climate change in your classroom

The WWF Climate Change Team has developed a comprehensive educational curriculum that will elevate students' knowledge of the issue and spur dialogue about what each of us can do to make a difference.

The high school-level curriculum is divided into fifteen lessons which include handouts, a glossary of terms and additional resources for ongoing discussions and research. Please feel free to use the lessons you believe your students will most benefit from.

Contact Us to receive a complimentary printed copy of the curriculum!

Curriculum can only be shipped within the U.S. We are sorry to our international teachers, but funding does not allow for international shipping.

www.worldwildlife.org/climate/seclimatewitness/curriculum.cfm

An entire unit on climate change by the World Wildlife Fund. It's pretty good.

Climate Change Education .Org

Portal/Web Site Dedicated to:
Global Warming Education
Climate Change Education
Science, Solutions -- Resources Directory

Portal Website -- used by millions. For Students, Teachers, Families, Researchers, Everyone

Climate Change Education.org Home

California Catalog Home

Kids

K-12 Schools

University Level

Science

Museums

TV, Film, Video

Events

Link Up

About

How We Know What We Know About Our Changing Climate:
Scientists and Kids Explore Global Warming
New Book by Lynne Cherry and Gary Baseman
Order On Line [Teacher Guide](#) [Cover Photo](#)
[Books](#)

Earth Day Events
U.S. & Planetwide
California
[Events](#)

K-12 Level Education Resources
Lesson Plans, Class Topics, Student Projects

Earth Sciences	Physical Science	Life Sciences
Social Studies	Current Events	Interdisciplinary
Mathematics	Language Arts	History

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

This fairly new site (launched early 2008) is notable because it is one of the few that offers discipline specific resources. Many of the lessons are directly related to polar science.

Although this site is not itself an advocacy site, it links to many of the 'more respectable' ones.



Annenberg Media presents

JOURNEY NORTH
A Global Study of Wildlife Migration and Seasonal Change

Welcome to Journey North! [Site map >>](#)

Journey North engages students in a global study of wildlife migration and seasonal change. K-12 students share their own field observations with classmates across North America. They track the coming of spring through the migration patterns of monarch butterflies, robins, hummingbirds, whooping cranes, gray whales, bald eagles – and other birds and mammals; the budding of plants; changing sunlight; and other natural events. Find migration maps, pictures, standards-based lesson plans, activities and information to help students make local observations and fit them into a global context. Widely considered a best-practices model for education, Journey North is the nation's premiere "citizen science" project for children. The general public is welcome to participate.

<http://www.learner.org/jnorth>

Journey North examines wildlife migration and seasonal change. It is not a polar studies site, but there is a discussion on climate, and some animals will fit nicely into a discussion of polar environs. This might be a way to talk about the poles in a way that fits naturally with other topics.



<http://www.polarhusky.com>

Go North! follows a dogsledding team across the arctic. It is a full curriculum unit (reading any Jack London in Language Arts class?)



<http://www.globe.gov>

GLOBE is not directly a polar resource, but its vision and mission make it an indirect route to the study of the poles.



<http://www.windows.ucar.edu>

Windows to the Universe. Excellent resources, many of which were featured in the Winter 2008 issue of The Earth Scientist (National Earth Science Teachers Association). This issue was dedicated to polar studies and IPY. Select 'Polar Regions' in the left sidebar menu.

Modeling and Data Resources



<http://www.edgcm.columbia.edu>

Educational Global Climate Modeling. This was developed from an older 'real' modeling program, so the difference between this and current programs is the grainy-ness of the data. (It will run on today's laptops – yesterday's supercomputers – current programs need the power of modern supercomputers.) Good for high school student direct use, middle schoolers would probably be more comfortable with demos. Learning curve isn't too bad!

<http://lima.usgs.gov>

<http://www.ceonims.org>

<http://www.armap.org>

<http://www.baidims.org>

All are mapping programs –All come recommended by teachers who have used them in secondary and above classes.





<http://science.nationalgeographic.com/science/environment/global-warming/gw-overview.html>

New-ish site from National Geographic, it's a source of current news rather than an educator resource. But teachers need these too.

Miscellaneous Sites – not easily classified, but some great resources in this group.



www.manpollo.org

This is a site where you can view and download “How it all ends” (script as well) – an excellent video (and more in the series also found here) about Climate Change and Risk Assessment. Good way to grab kids attention, to show to the skeptics, and to set the stage for discussing things like risk and the nature of science. This is the YouTube link:

http://www.youtube.com/watch?v=mF_anaVcCXg



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

An online magazine sponsored by IEEE (the acronym has replaced the older name of Institute of Electrical and Electronics Engineers) and their subgroup ICEO (IEEE Committee on Earth Observation). It is a source of current original and syndicated news articles, categorized by both headline value and discipline relevant.

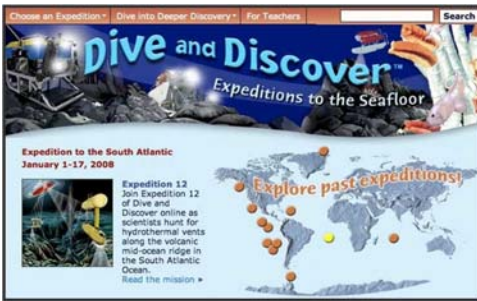


<http://users.erols.com/jackbobo/>

Here you will find the Antarctic Treaty Papers as well as links to other information of Antarctica's history and the Summit. The next summit is to be in 2009; this would be a good opportunity for an interdisciplinary unit and some great contemporary discussions about the import of the treaty. The summit's official home page is

<http://www.atsummit50.aq/site/copyright.php> and some very good resources can be found here:

<http://www.ipy.gov/DesktopModules/Articles/ArticleDetails.aspx?ItemID=236>



<http://www.divediscover.whoi.edu>

Not exclusively a polar science site, there are some great resources and activities for their expeditions to the poles. (Woods Hole can usually be relied on for high quality materials.)



<http://www.sencer.net>

Science Education for New Civic Engagements and Responsibilities. This site has been included not for its polar studies (almost – but not completely – non-existent) but as a resource for educators looking at service learning models and ideas for expanding a class beyond single discipline content.



<http://learningcenter.nsta.org/>

The NSTA Learning Center contains archives of the IPY Symposia from the various meetings. Web seminar materials are archived here as well. NSTA members have free access in addition to free registration to most materials found here.

Advocacy Group Pages – no inference should be made pro or con about any of these groups, except that they tend to have reliable, authentic data and their websites ‘pass’ evaluation criteria.



<http://www.copusproject.org>

Coalition on the Public Understanding of Science. Well, okay... not a polar resource. But this relatively new advocacy organization that endeavors to promote public awareness and understanding of science. It has big name supporters that suggest it will be an ever growing resource deserving of periodic checks.



http://www.ucsusa.org/global_warming/science/global-warming-materials-for-educators.html

The Union of Concerned Scientists has a great deal of information and many resources for educators.



<http://www.focusthenation.org/index.php>

This advocacy group sponsors many awareness events (Earth Hour, the fall 2007 Climate Change Teach-In, etc.) and promotes solutions rather than only doom and gloom scenarios.



<http://globalwarmingcalifornia.net/>

This is a mix of resource types from Climate Change Education.

Books as Hooks – use fiction and nonfiction to extend student interest in polar science and to enlist the collaboration of the Language Arts folks. Biographies can link to careers, historical novels can link to context; mysteries and science fiction that use polar settings can stimulate general interest rather than be content specific resources. The books listed all do well in School Library Journal, Booklist, and ALA reviews. There are many, many more!

- *Give Me my Father's Body* by Kenn Harper, ISBN = 074341005X
- *The Mad Trapper* by Rudy Wiebe, ISBN = 088995268X
- *Artemis Fowl: The Arctic Incident* by Eoin Colfer, ISBN = 0786817089
- *Braving the Frozen Winter* by Rebecca L. Johnson, ISBN = 082252855X
- *Troubling a Star* by Madeleine L'Engle, ISBN = 0440219507
- *Mr. Popper's Penguins* by Richard Atwater, ISBN = 0316058432
- *Poles Apart* by Elaine Scott, ISBN = 0670059250
- *Brrr!! A book about Polar Animals* by Melvin and Gilda Berger, ISBN = 0439201659
- *Shipwreck at the Bottom of the World* by Jennifer Armstrong, ISBN = 0375810498

Finally, the big ones....



<http://www.ipcc.ch>

The Intergovernmental Panel on Climate Change. This is the site for the origin of the reports. For students, the most readable sections are the news releases. Excellent image and graph resources are available on the site. This is the 'horse's mouth.'



<http://www.climatechange.gov/default.php>

The U.S. Climate Change Science Program. Much on this site seems to be a resynthesis of the IPCC work, but at a very accessible level for students and teachers.

Others...

There are sure to be many more resources than are listed here – check out NPR for recent broadcasts. The IPY agency sites frequently link to recent, relevant broadcasts. Look to PBS for the several NOVA specials and related materials. Keep an eye on NSDL and Teachers Domain as they grow their portfolios. This list does not pretend to be definitive or comprehensive, and hopefully will keep growing as other quality web resources are developed.

All sites active Summer 2008