The ICE workshop was organized by Mark S. McCaffrey of the Cooperative Institute for Research in Environmental Sciences (CIRES) and Peter Tuddenham of The College of Exploration through funding from the National Science Foundation’s Office of Polar Programs and the National Oceanic and Atmospheric Administration’s Office of Education.

International Polar Year 2007 - 2009

The ICE Online Workshop is now over. Please join the ongoing special topic conversations online. More information on next steps, and summaries will be posted here in the near future.

The College of Exploration is recognizing the International Polar Year. We hope to provide learners of all ages with exciting programs related to the role the Poles of the Earth play in our daily lives.

September 2008 - Online Educator Workshop on Polar Science.


The workshop is now over, however various discussions on specific topics are continuing, and all the proceedings of the two week workshop can be read.

REGISTRATION HERE

Find out more

Short movie on how to register. It is easy really!
## Table of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acknowledgements</td>
<td>4</td>
</tr>
<tr>
<td>Executive Summary</td>
<td>5</td>
</tr>
<tr>
<td>Overview</td>
<td>7</td>
</tr>
<tr>
<td>ICE Goals and Objectives</td>
<td>13</td>
</tr>
<tr>
<td>Internal Evaluation</td>
<td>17</td>
</tr>
<tr>
<td>External Evaluation</td>
<td>43</td>
</tr>
<tr>
<td>References</td>
<td>52</td>
</tr>
<tr>
<td>Appendices</td>
<td></td>
</tr>
<tr>
<td>Appendix I. Survey Instruments</td>
<td>i</td>
</tr>
<tr>
<td>Appendix II. Agenda</td>
<td>ix</td>
</tr>
<tr>
<td>Appendix III. The College of Exploration Survey Reports</td>
<td>x</td>
</tr>
<tr>
<td>Appendix IV. Visitation Data</td>
<td>xlvi</td>
</tr>
</tbody>
</table>
Acknowledgements

We are grateful to the National Science Foundation's Office of Polar Programs (OPP) and NOAA Office of Education for their support.
Executive Summary

**Background.** International Polar Year (IPY) begins in March 2007 and runs through March 2009. A primary goal of IPY is “to attract and develop the next generation of polar scientists, engineers and logistics experts [and] to capture the interest of schoolchildren, the public and decision-makers” (International Programme Office, 2005). Within the United States, the polar science and education community has sought to ensure that all education, outreach, and communication activities contribute to a coordinated, interdisciplinary, international effort.

**Sponsors.** The U.S. National Science Foundation (NSF) Office of Polar Programs and the U.S. National Oceanographic and Atmospheric Administration (NOAA) Office of Education sponsored a two-week online workshop during 17-31 March 2006. The workshop was open to any educator, scientist, outreach professional, or member of the general public interested in IPY. The University of Colorado’s Cooperative Institute for Research in Environmental Sciences (CIRES) and The College of Exploration were the organizers.

**Outcomes.** The ambitious expected outcomes of the workshop were: 1. List top concepts related to IPY and the poles to be considered by educators; 2. Begin a framework for polar literacy; 3. Develop details and methods for implementation by, to, and with different, diverse, and indigenous audiences/populations; 4. Foster collaborations and create, enrich, and strengthen a learning community which can continue online; 5. Identify ideas for measuring IPY education efforts at the end of IPY; 6. Entrain greater awareness of use of technology; and 7. Respond to needs of participants.

**Keynotes.** The workshop was opened by a video welcome from Dr. Dave Carlson, Director, International Program Office, International Polar Year. A presentation was also given by Mark McCaffrey from CIRES on steps already taken towards polar literacy.

**Purpose.** One of the main purposes of the workshop was to achieve consensus on the most important concepts concerning the Poles. A pre-workshop survey asked participants for their top three to five. The answers were the basis for an online discussion for the first week. Over 84 comments were posted and helped everyone move towards an integrated, collaborative sense of what is important. A summary list of ten was compiled:

1. The uniqueness of the polar regions
2. The complex inter-connections in the Earth system
3. Global climate change
4. Importance to science
5. History and culture
6. Places of extremes
7. New models of land ownership/stewardship and international collaboration and cooperation
8. Need and opportunity to study holistically
9. What we don't know, the spaces between disciplines, and the gaps in our knowledge
10. People and stories
**Misconceptions.** Another key area of investigation and sharing was the listing and discussion of misconceptions. The pre-survey uncovered a long list from participants. The discussion resulted in 84 contributions. This area has a huge potential for further work. An effort was made to produce a chart of Key Concepts, Intended Understandings, and Naïve Conceptions.

**Breakouts.** The planning committee wished to offer the broadest possible participation. To achieve these 12 separate areas were available: K-Graduate Education, Informal Ed, International Collaboration, IPY Plans, Diverse Audiences, Field Experiences, Young Scientists, Ed Tech & Digital Media, Data Communications, Art Gallery, Arctic Residents, and Funding. Some were more active than others.

**Other Features.** Additionally the workshop offered a reception and technical help area, a collection of resources, a contribution to a calendar, and a social space “café.” This area was host to The HipBone family of games and analytic tools which is a toolset for “mind-to-mind” collaborative thinking. They focus on a very powerful human habit of thought (and cognitive style)—that of making associations between one thing and another. In simple terms, this is a matter of seeing patterns: similarities, analogies, symmetries, isomorphisms.

**Results.** The results include a number of reports from surveys, the lists of concepts and misconceptions, and a network of interested communicators and educators. The workshop created a greater awareness about a broad range of communication and educational opportunities, challenges, and technologies that relate to polar regions and their global linkages in general and IPY in particular.

<table>
<thead>
<tr>
<th><strong>Purpose and Goals</strong></th>
<th><strong>Outcomes and Outputs</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>List of top concepts related to IPY and the poles to be considered by educators.</td>
<td>List of 10 compiled.</td>
</tr>
<tr>
<td>Begin a framework for polar literacy.</td>
<td>Links between concepts, understandings, and misconceptions made. Table created.</td>
</tr>
<tr>
<td>Develop details and methods for implementation by, to, and with different, diverse and indigenous audiences/populations.</td>
<td>Difficulties and challenges identified. Example programs shared and personal connections made.</td>
</tr>
<tr>
<td>Foster collaborations created, enriched, strengthened; create a learning community which can continue online.</td>
<td>Over 200 participants. Many new introductions and personal connections made.</td>
</tr>
<tr>
<td>Identify ideas for measuring IPY education efforts at end of IPY.</td>
<td>Limited discussion and progress. More work is required to define measurements.</td>
</tr>
<tr>
<td>Entrain greater awareness of use of technology.</td>
<td>Variety of education and communication technologies used during the workshop.</td>
</tr>
<tr>
<td>Respond to needs of participants.</td>
<td>Surveys before during and after the workshop captured a wealth of information and informed design.</td>
</tr>
</tbody>
</table>
Overview

Background

The original “international year,” the International Polar Year 2007-2008 (IPY) builds on the 125-year legacy of international science collaboration inspired by the vision of Karl Weyprecht, an officer in the Austro-Hungarian navy who called on nations to share resources and research findings through a focused, intensive effort in order to better understand polar regions (McCaffrey, 2006a). Subsequent international years include the Second IPY (1932-3) and the International Geophysical Year or IGY (1957-8); each marked a substantial step forward in the study of the Earth system, particularly in terms of the scientific understanding of polar regions and their global impact.

In the United States during the IGY, the National Academies led efforts to develop educational materials, including updates in the Weekly Reader newsletter for children and a series of 13 education films that were shown in classrooms around the country on specific research themes of IGY (Korsmo, 2004).

Recognizing the potential for IPY 2007-2008—actually a two year “year,” running from March 2007 to March 2009—as a catalyst for science education, the planners developing the vision and goals for the upcoming IPY at both the national (NRC, 2004) and international (ICSU, 2004) levels emphasized the importance of supporting education, outreach, and communication efforts to convey IPY research and activities to broad audiences.

In 2004, the National Science Foundation (NSF) supported the “Bridging the Poles: Education Linked with Research” workshop organized by Drs. Stephanie Pfirman and Robin Bell of Columbia University. The workshop engaged a wide range of participants who identified resources and strategies that could be leveraged in support of IPY education efforts. The report summarizing the workshop findings (Pfirman et al., 2005) is available online: http://www.ldeo.columbia.edu/res/pi/polar_workshop/.

In 2005, with seed money from the Cooperative Institute for Research in Environmental Sciences (CIRES) at the University of Colorado at Boulder and in-kind support from the National Oceanic and Atmospheric Administration (NOAA), the Poles Together Outreach and Education Workshop for International Polar Year (IPY) was held in Boulder, Colorado. Over 100 participants met between July 20 to 22 to discuss education, outreach, and communication (EOC) strategies for the upcoming IPY. A summary and evaluation of the workshop (McCaffrey, 2006b) is available at: http://cires.colorado.edu/education/k12/ipyoe/.

Development of ICE

Within the United States, the NSF has been the lead agency for IPY as well as the primary source of potential funding for IPY 2007-8 education and outreach efforts. A formal solicitation for IPY proposals, including formal and information education and coordination efforts, was made available in January 2006 with a May 1 deadline. With the aim of engaging the broad IPY community interested in EOC collaborations prior to the May 1 deadline, the NSF Office of Polar Programs and NOAA’s Office of Education agreed to fund an online workshop, which was originally titled “Integrated
Communication Effort” or ICE, later changed to “Integrated Collaborative Education.”

Mark McCaffrey, who is a member of the IPY Education, Outreach, and Communication subcommittee, served as the Principal Investigator of the workshop, collaborating with The College of Exploration, which has hosted a variety of online seminars and workshops for NSF, the Center for Ocean Science Education Excellence (COSEE) program, and NOAA’s Office of Education and National Geographic efforts to develop a framework for ocean literacy to benefit the marine science education community. Approval for the workshop was finalized in late February 2006, a steering committee was engaged to help organize the elements of the workshop, and potential participants were recruited.

It was also determined that after the workshop was officially concluded on March 31, the site would be kept open to allow the discussions and resources to be accessed and utilized.

The Workshop Format
The workshop was held online from March 17 through March 31, 2006, in an asynchronous format, allowing participants to take part at times convenient for their schedule, and also allowing flexible participation across time zones, encouraging nationwide and international participation. The workshop was delivered online over the Internet in a private learning space, with the participants needing only a web browser and private password. This is a proven format developed and offered by The College of Exploration over the past ten years.

The online conference included presentations, updates, demonstrations, surveys of user experience and satisfaction, general discussions on polar literacy and key concepts, and breakout groups around existing and emerging themes.

Prior to the workshop, a pre-workshop survey/needs assessment of potential participants helped guide the workshop design and format particularly the number and structure of breakout sessions. A post-workshop survey gathered feedback from participants at the conclusion of the workshop.

Special private online spaces were set up for the project team to meet for planning and implementation. This allowed team members to have behind-the-scenes meetings to ensure successful development of the project and inclusion of all committee members in all facets and phases of the project.

The Workshop Components and Activities
Within the online environment, the workshop was set up to include various components/“areas,” in which the workshop activities took place.

Below in Figure 1 is a screen capture of a page, which displays the key workshop areas.

There were main areas that included a reception, a meeting place, a resource area, as well as a café (social space) and a calendar. In addition there were a number of breakout sessions based on audience of interest (K-graduate formal education, informal education, etc.) or themes of interest (international collaboration, data communication, funding etc.).
The primary focus of the workshop occurred in the Kasimmavik Meeting Place where facilitated discussions explored the development of a framework for polar literacy through the identification of key concepts and misconceptions about polar science. Here participants were encouraged to introduce themselves and to engage in the main topics of dialogue related to basic concept for a framework of polar literacy, connections to daily lives, and misconceptions related to the poles.

**Breakout Rooms**

Twelve thematic-focused breakout “rooms” were established, including one devoted to Arctic Residents. These afforded the participants a worthwhile diversity of discussions. Each breakout room was led by a facilitator with special expertise in the topic whose role was to encourage dialogue. Informal and formal educators had special discussion...
breakout rooms in which to interact with other educators.

**Reception and Café—Social Interaction**
The schedule called for participants to spend the first few days introducing themselves and participating in demonstrations and presentations. A reception area was set up to cover the nuts and bolts of the workshop. The Uqaqtut Café was established to for socializing. In the opening days of the workshop, participants were encouraged to share stories about polar regions, and a game of “HipBone,” a “mind-to-mind” game for exploring conceptual connections, was hosted by Charles Cameron, which several participants mentioned as one of the highlights of the workshop in their survey responses. (For more on HipBone, see: http://home.earthlink.net/~hipbone.)

**Resource Center**
A resource center was the gathering place for shared resources on polar topics and offered the participants an extensive selection of multimedia materials for use in their work. Project team members and participants shared links to web sites, lesson plans, alignment of polar topics to national educational standards, recent and historical maps of polar regions, lectures, videos, news, and programs. This database serves as a good foundation for an archive of polar-related communication and education resources to be used as needed in the future.

**Participant Statistics and Demographics—Engaging a Wide Diversity of Those Interested in Polar Education and Communication**

While prior online workshops, such as the Ocean Literacy Workshop, were limited in the number of participants allowed to participate, it was decided for the sake of inclusiveness that there would be no limit on the number of ICE participants.

By the end of the ICE workshop, 227 participants had registered, although a significant number (nearly 50) never logged in or participated. (For a detailed analysis of the workshop based on survey results and other data, see the Internal Evaluation report on page 17.) A group of several dozen people participated in the core discussions of the meeting, which focused on identifying key concepts of polar literacy.

The workshop was successful in attracting participants from a variety of professional backgrounds. The largest numbers were K-12 educators and scientists, followed closely by informal educators, outreach professionals, and university faculty. There were also a small number of government personnel, media representatives, NGO representatives and funders. A small number of participants were Arctic residents. Participants were mainly from the US but a small number of participants came from other countries, including Argentina and Singapore.

Participants’ areas of interest and expertise covered both poles and included a wide range of subject topics from climate change to polar history.

**Benefits and Positive Outcomes**

The workshop promoted:
The development of collegial relationships
Increased knowledge of salient polar topics and concerns
Awareness of work being done by other groups
Solid groundwork on the framework for polar literacy

**Networking**

Networking with other participants was a theme that emerges from the feedback of many who responded to the final survey. Participants valued the opportunity to connect with others from different professions and diverse locations to discuss IPY education and outreach issues. They also appreciated the opportunity to find collaborators for projects and share ideas with others in their profession.

At least one proposal to NSF has been submitted to further explore key polar concepts and misconceptions as a result of this workshop, and the relationships established during this workshop certainly have the potential for more proposal collaboration and project partnership.

**Polar Resources Database for Ongoing Use**

Prior to and during the workshop, an extensive resource database was collected for ongoing use by participants, even after the workshop ended. Participants reported that this resource center provided valuable resources to use in their work. They stated that the most useful resources were links to websites, TCOE lectures on the poles, polar content information, teacher-related resources, and information about programs,

**Presentations at National Education Conference**

As a result of the relationships developed through the ICE workshop, a number of educators participating in ICE had discussions in the breakout room, which led to submissions for IPY-related sessions at the National Science Teachers Association conference in 2007.

**A Foundation for a Framework for Polar Literacy**

The workshop established productive dialogue and the start of a framework for polar literacy. Participants discussed and debated the identification, delineation, and description of polar concepts. They also relayed the common misconceptions with which they are confronted; an interesting and lengthy interchange about misconceptions took place in the meeting room. Several respondents to the final survey mentioned the misconception and key concept work as being a highlight of the workshop.

Several days before the end of the conference, Peter Tuddenham proposed a “top ten” list of polar concepts based on his analysis of people’s comments in their introductions and input from surveys. These concepts were as follows:

1. The uniqueness of the polar regions
2. The complex inter-connections in the Earth system
3. Global climate change
4. Importance to science
5. History and culture
6. Places of extremes
7. New models of land ownership/stewardship and international collaboration and cooperation
8. Need and opportunity to study holistically
9. What we don’t know, the spaces between disciplines, and the gaps in our
10. People and stories

A framework was initiated using the key concepts to correlate them with the intended understanding, the naïve conceptions (or misconceptions), national science education standards, and connections to daily life. The framework was not completed, and discussions focused primarily on the AAAS Project 2061’s Strand Maps, and a framework for IPY science education that people within NOAA and NASA have been developing:

Rates of Change
Global Connections
Exploring the Unknown
Earth Analogues

Barriers

As with any workshop, whether face-to-face or online, a number of constraints can create a barrier to effective workshop implementation and optimized participation. Several of the challenges expressed by participants and project team members to their participation are described below.

From the perspective of the project team, one of the greatest challenges was the short time frame for development of the workshop. There were only a few weeks from the time of formal announcement of project grant award to the required start date to develop the workshop. This was a much shorter than normal turn-around time for a workshop of this scope and complexity. This created challenges for the committee’s involvement as well as shortening advance notice for participants to block off time to participate. It also created real pressure for conducting the needs assessment in a timely manner to use the feedback to improve design.

For participants, time was a barrier for participation and because participation was voluntary, work time constraints prevented full participation for many. Some people participated during the initial few days but dropped away by the second week. Some participants felt that the workshop did not have a targeted focus and needed a stronger sense of direction. Even though steering committee members were recruited to help facilitate and recruit for the breakouts, the conversation in some of the breakout rooms was not as active as was anticipated.

While it was hoped that the workshop would help participants identify new funding opportunities for IPY EOC, survey respondents replied that it had not accomplished this. Many researchers in the United States participating in ICE were already aware of the NSF IPY opportunity, and alternative or supplemental sources of funding remain elusive.

Although the goal of developing consensus and reaching closure was not achieved, and no final product of polar literacy was developed through the effort, significant progress was achieved toward establishing a framework for polar literacy. A full framework was beyond the scope of this project and would need significant more resources to attain this goal.
ICE Goals and Objectives

Goal

The overall goal of the ICE workshop was to engage a broad community of scientists, educators, media experts, evaluators, and other key stakeholders involved with the International Polar Year 2007-2008 to build on previous work and identify important messages and concepts to communicate to various audiences during IPY, and determine effective strategies to accomplish that communication.

Aims

The workshop aimed to:

• Build on the work of prior committees and workshops focused on planning International Polar Year 2007-2008 (IPY) outreach, education and related communication efforts;

• Engage, expand and inform the emerging community of researchers, educational practitioners, media specialists and exhibit experts involved with IPY education and outreach;

• Foster cooperation, communication and collaboration throughout the IPY community in order to help achieve the goals and vision of IPY; and

• Identify key concepts and messages for broad and targeted audiences that communicate the importance and relevance of polar regions and research to all people and regions of the world.

Objectives

Workshop objectives and their level of attainment are as follows:

• To design an online community of practice for the community of polar scientists, communicators, educators, outreach professionals, students, and others to present to the world a series of consistent communication messages and educational programs that help achieve the broader goals for the whole IPY program.
  * The workshop served as a forum and community of practice for diverse groups of participants, serving over 200 scientists, formal and informal educators, outreach professionals, university faculty, as well as a smaller number of other professionals involved in media and education.

• To begin to identify quantitative and qualitative baselines and measures for determining whether IPY and related programs
  * improve polar literacy among the intended audiences,
  * build awareness of Earth system science and
  * increase diversity within the geosciences.
  * A thoughtful and lively conversation occurred in the meeting room about evaluating the effects of IPY initiatives and how that might be accomplished. The importance of evaluation of education programs was highlighted—determining a
Participants discussed “getting a baseline of what the learners already know (and what they want to know) in order to figure out where to start, what will be engaging, and also to be able to see afterwards if what you did/provided/made available caused a change.” They proposed looking at how interactions and perceptions change as a result of programs as a result of the whole IPY initiative. They questioned who will measure this and how will the collective influence of IPY be measured?

- To determine a way to measure progress within the IPY community towards integrated communication and collaboration.
- To delineate key concepts and messages about polar regions and science to be communicated.
  - The lists of key concepts, misconceptions, and connections that were developed as a result of the first survey provided a starting point for lively discussion of these issues at ICE.
- To make web collaborative opportunities available to the IPY community.
  - Participants valued the networking they were able to do during ICE and many plan to continue to pursue collaborations they developed at the workshop, indicating community-building. The discussion of the key concepts for education and outreach on IPY topics was a step towards consistency among those who participated and those they work with.
- To present, discuss, and approve the summary document of the Poles Together workshop through facilitated online discussion.
- To present new and emerging opportunities and challenges through presentations and demonstrations.
  - Three respondents to the final survey indicated they would use the lectures and/or presentations provided on ICE in their future IPY education and outreach work. Many participants expressed through the surveys that they appreciated learning about the wide variety of IPY-related projects that are underway and planned. Both the opportunities and the challenges for IPY outreach were discussed, according to survey feedback.
- To build on the thematic breakouts and develop a community-based position paper that will be made available by the end of the conference.
- To establish an online forum for continued discussions and collaborations to develop beyond the workshop.
- To encourage diversity among participants and to develop strategies to reach broad, diverse audiences with IPY related education, outreach and communications.
  - The Diverse Audience breakout received 297 visits during the workshop, indicating active interest in this topic.

**Deliverables**

Deliverables for the workshop and their level of success at the workshop included the following:

- Definitions of a key messages relating to climate and polar research community for IPY audiences
Within the Meeting room in the Misconceptions and Concepts/Themes threads, the participants worked on developing lists and charts that included common misconceptions and key education concepts about polar issues.

- Identification of how those key messages will be promulgated to the various audiences
  - Teachers replying to the surveys indicated they had discovered some valuable ideas for communicating IPY topics to their students at the workshop. Others relayed valuable collaborations formed at ICE that would assist them in their outreach work.

- List of suggested potential measurement factors of impact relating to key messages
  - This was not addressed significantly

- Fostering a broad community of practice that has stronger knowledge of and about each other

Respondents’ countries that were identified within evaluation surveys showed that the vast majority of participants were from the USA (79% of final survey). Canada was the next most-represented country at 10% of the respondents, followed by Germany (5%). Only two countries (5% of respondents) represented were southern hemisphere—Argentina and Australia. It may be that comfort with English was a barrier for some international participants in their willingness to respond to the survey(s), so actual participant demographics may have been more diverse. However, the most common point respondents made about the value of ICE in their work was networking with other IPY professionals and learning about the diverse projects IPY encompasses.

**Pre-workshop survey to develop initial list of ideas**
The pre-workshop survey produced both a list of basic concepts, misconceptions, and connections that were used to generate discussions in the breakout groups. It helped managers refine the conference presentation.

**Post workshop survey on process and output of workshop**
The post-workshop survey assessed the process and overall effectiveness of the workshop.

**Documentation on the web of the whole workshop process**
The entire workshop is available for viewing by interested visitors.

**Website that serves as continuous update on education communication messages and actions throughout IPY**
Some participants indicated they would continue to visit the website for developing information.

**Resource list for implementing communication process**
Most of the respondents to the final survey indicated they planned to use links and other ICE resources after the workshop ended. Since the end of the workshop, 67 participants have returned to the conference.

**Next Steps**

As it became clear that there would be no group consensus by the official deadline for the workshop, one participant proposed steps to leverage the work that had been accomplished through the initial discussions:

1. Organize into target-oriented groups (TOGs). That is, early education, elementary, secondary, post-secondary, public, and professional development OR K-12, post-
secondary, and public.

2. Identify leaders for the TOGs and interested (and committed) participants.

3. Draw a network representing the people and links which emerge from #1 and #2. This will give us an idea of the organizational hierarchy and where we are lacking expertise, etc.

4. Develop and evolve theme 'charts' for each TOG. Identify linkages between TOGs.

5. Develop a network-wide strategy for IPY education with the realization that each TOG may have specific goals. In other words, serve the TOGs but also the network.

6. Identify a body/unit/place/organization that will 'host' the network and provide what is essentially a community framework to work off.

Another participant noted that the top ten themes overlapped with the official IPY themes established at the international level:

Theme 1: Status
Theme 2: Change
Theme 3: Global
Theme 4: Frontiers
Theme 5: Vantage Point / Observing System
Theme 6: Human Issues

**Conclusions**

Organized on a tight timeline, with mixed success at facilitating discussions, recruiting diverse participants, and achieving its broad goals and objectives, ICE served as an effective networking forum for its participants, who included international polar scientists, educators, media experts, and others supporting the potential for the International Polar Year to serve as a catalyst for increasing society awareness about polar regions and their global connections.
Internal Evaluation

This report reviews the findings based on the evaluation instruments (questionnaires) employed during the Integrated Collaborative Education (ICE) online workshop for the International Polar Year (IPY), facilitated by The College of Exploration (TCOE) during March 17 through April 2, 2006. An additional evaluation report conducted by Dr. Howard Walters of Ashland University, who analyzed the format and dialog within the workshop discussions follows, beginning on page 43.

Highlights of the findings from the evaluation surveys include the following:

- Participants were relatively satisfied with their experience at the workshop.
- The workshop was highly valued as a networking opportunity for those interested in IPY education, outreach, and communication efforts.
- Participants appreciated learning about the work being done by scientists, educators, and outreach specialists around the world in support of IPY and many hoped to spread the word within their organizations.
- Other than the orientation rooms, the most popular topic-based breakout rooms were for K-Graduate Education, International Education, and Informal Education.
- Although 26% of participants did not return after the first week, participation remained fairly high and continued even after the workshop ended, indicating its usefulness as an ongoing resource.
- Most of the survey respondents were scientists, K-12 educators, informal educators, outreach specialists, and university faculty members. Very few media representatives, funding institution professionals, or students were among the respondents.
- Research interests were consistent among respondents, with the top choices being Arctic, Antarctica, and Climate. The top choices for Education/Outreach interests were Formal Education, Informal Education, and Integrating Research, Education, and Communication.
- Several Arctic residents participated, but more might be recruited for future events.
- More than half of the survey respondents had been to either the Arctic or Antarctica.
- Respondents were most concerned with getting IPY topics integrated into K12 education, but developing effective public outreach was another area of strong interest.
- The most commonly-cited personal source for IPY information was online resources, followed by conversations with colleagues.
- There was enthusiastic participation in the quest to define the top-priority IPY concepts for education and outreach, as well as the top-priority misconceptions to address. These efforts, while incomplete during the workshop period, were considered some of the most important outcomes of ICE by respondents who completed the survey.
- Very few participants reported discovering new funding opportunities for IPY work at ICE; however, many replied that they had found collaborators.
- Participants looked forward to continuing to use the links to websites that were provided at ICE, as well as other resources. They particularly hoped that the IPY Plans and K-Graduate Education rooms would be available.
Internal Evaluation Recommendations

Based on survey responses and other input from participants, the following recommendations were made for future ICE or other online workshops:

- A one-week workshop might allow full participation by everyone.
- Fewer breakout groups would allow more breadth of participation by all participants.
- Limiting the number of participants would keep the quantity of discussions down, allowing participants more time to participate throughout the breadth of the workshop.
- Consistent and more frequent guidance by moderators in all breakout rooms would support progress towards goals of workshop.
- For future online workshops, the registration survey should be completed by all participants to give a better response rate. Evaluation personnel should be designated to personally request post-workshop surveys from all participants to similarly increase that response rate.
- Data from surveys and visitation software should be collected in its raw form so that disaggregated statistical analyses may be run.
- Active recruitment of media representatives and funding agencies might encourage more from those professional roles to participate in future workshops.
- Active recruitment of under-represented geographic regions and under-represented demographic groups might result in a more diverse group of participants.
Evaluation Procedures

Internal evaluation of ICE included the collection of data from three surveys (see Appendix II) before, during, and after the workshop. The first survey was a call-for-interest instrument established before the workshop. The second instrument was an optional registration survey. The third was a final summative survey provided at the end of the workshop. Data collected from these instruments are summarized in this report.

Due to budget limitations, it was not possible to disaggregate the survey data; descriptive statistics and graphical representations are included below. The summaries of open-ended questions include direct quotes from survey respondents in text boxes wherever possible; these quotations were selected because they were representative examples of respondent comments on specific topics.

Survey data summaries from the TCOE team, including complete responses to all open-ended questions, are included in Appendix IV.

Visitation data to the various breakout rooms were also collected by TCOE and are summarized below. Participant comments from the surveys are included in text boxes to illustrate points throughout this section.

External evaluation was conducted as an analysis of the conference format and participant dialog characteristics by Dr. Howard Walters of Ashland University. His report is included after the internal evaluation analyses.

Survey Response Rates

Of the 246 workshop participants, 12 were organizers of the workshop, while an additional seven were on the workshop steering committee. Thus, 227 participants were not tied to the creation of the workshop. This is the number used to calculate response rates.

Because none of the surveys were mandatory, the response rates were relatively low (17-19%). No tracking of respondents was done, so there is no way to determine whether a specific respondent replied to one, two, or all three surveys (or none at all). The surveys did not require responses to all questions; therefore, the response rates given below reflect the most-answered question for each survey. The following are the number of respondents to each survey:

<table>
<thead>
<tr>
<th>Survey</th>
<th>Responses</th>
<th>Response Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call-for-interest</td>
<td>39</td>
<td>17%</td>
</tr>
<tr>
<td>Registration</td>
<td>42</td>
<td>19%</td>
</tr>
<tr>
<td>Final</td>
<td>39</td>
<td>17%</td>
</tr>
</tbody>
</table>

Table 1. Survey response rates.
Visitation Data

There were 22 people who registered but never came into any of the “rooms” in the conference. One participant visited the breakout rooms only and did not visit any of the main rooms. There were 64 who visited the main rooms only and did not visit any breakout rooms. The average number of visits to breakout rooms over the course of the conference was 48. There was a wide range for the number of visits by participants—1 to 266. The median number of breakouts visited was 15. Visitation data for workshop organizers are not included in the analysis. See Figure 2 for a breakout of visitations per participant. A complete data distribution graph is included in Appendix V.

![How many times did a participant visit the workshop?](image)

Figure 2. Visitation counts per visitor during the ICE workshop.
The most visited room was the main Meeting room, with 1533 visits. Four of the five general orientation rooms (Cafe, Meeting, Reception, Resources) each had over 400 visits from participants; the only two topic-based rooms at that level were K-Graduate Education and International Collaboration. See Table 2 and Figure 3.

<table>
<thead>
<tr>
<th>Breakout Room</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>March 06 Meeting</td>
<td>1533</td>
</tr>
<tr>
<td>Café</td>
<td>780</td>
</tr>
<tr>
<td>K-Graduate Education</td>
<td>695</td>
</tr>
<tr>
<td>Reception</td>
<td>619</td>
</tr>
<tr>
<td>Resources</td>
<td>473</td>
</tr>
<tr>
<td>International Collaboration</td>
<td>409</td>
</tr>
<tr>
<td>Informal Ed</td>
<td>363</td>
</tr>
<tr>
<td>Ed Tech &amp; Digital Media</td>
<td>352</td>
</tr>
<tr>
<td>IPY Plans</td>
<td>317</td>
</tr>
<tr>
<td>Diverse Audiences</td>
<td>297</td>
</tr>
<tr>
<td>Field Experiences</td>
<td>296</td>
</tr>
<tr>
<td>Arctic Residents</td>
<td>291</td>
</tr>
<tr>
<td>Data Communications</td>
<td>278</td>
</tr>
<tr>
<td>Young Scientists</td>
<td>264</td>
</tr>
<tr>
<td>Art Gallery</td>
<td>243</td>
</tr>
<tr>
<td>Calendar</td>
<td>224</td>
</tr>
<tr>
<td>Funding</td>
<td>202</td>
</tr>
</tbody>
</table>

Table 2. Visitation by room.
Figure 3. Visitation counts by room.
The date on which a participant **last visited** the workshop was also tracked for 216 participants from March 17 through June 7, 2006. During the first week (3/17-3/25), 57 (26%) participants made their final visit to the workshop. During the last week (3/26-4/2), 83 (38%) participants made their final visit. After the workshop officially ended on April 2, 76 (35%) participants returned to the conference. Thus, 73% of the participants tracked participated in the final week of the workshop or continued to visit after its end. See Figure 4. Appendix V shows the detailed data.

![Figure 4. Date the workshop was last visited by participants.](image)

The participants were encouraged to plan to participate one hour a day for two weeks, or roughly the equivalent of two full days in a face-to-face workshop. For some, this was difficult.

> [I] had no time to follow the workshop closely—participant

Other participants commented they would have participated more if they had been able to find more time.

Some people mentioned that there was just too much of interest going on and they had to pick and choose what discussions they participated in; often they regretted not having more time to explore more of the variety available at the workshop.

> I was able to participate on a regular basis for about 3/4 of the workshop. During the last 1/4 I was too busy with other things to log in regularly. I felt that this was unfortunate and my loss. I am glad that we will still have access. I enjoyed facilitating one of the breakout groups. However I felt there were too many other interesting alternatives and it took more than I would have liked to figure out where I was going to spend most of my time. Even at that I found it difficult to participate in more than one breakout group in a meaningful way.—participant
Survey Instrument Data

Completing the surveys was not mandatory for participants. This may partially explain the fairly low response rate of 16%-17% of the registered participants on each survey. The respondents may not have been a representative sample of the workshop participants in general. There is no way to know whether the same participants responded to each of the three surveys, as tracking information was not gathered in all three questionnaires.

The three instruments used during the course of the workshop each had a similar number of respondents (39-42). The surveys each asked some of the same questions, including Primary Role Related to IPY. When we compare the respondents to this question across the three surveys, the results are fairly well-matched (see Figure 5). One interesting item is that there were no students among the respondents until the final survey. Very few respondents were from the media or funding institutions.

![Primary Role of Respondents](image)

Figure 5. Primary roles of respondents to surveys.

Each of the three surveys also asked respondents their area of research interest and expertise as well as education and outreach expertise. The Arctic, Antarctica, and Climate were among the top four selections for research areas in all three surveys. The three top choices for areas of education and outreach expertise were the same for all three surveys—Formal Education, Informal Education, and Integrating Research, Education, and Communication.
Survey Results Summary

Pre-Workshop Survey Results Overview

The Call-for-Interest survey was sent out prior to the workshop to likely participants in hopes of informing the managers in their fine-tuning of the workshop design. The survey received 39 respondents to the questions.

Four of the multiple-choice/short-answer questions addressed the respondents’ country of residence and professional position. Out of 39 respondents, 32 were from the United States. Three were from Canada, with one each from Argentina, Norway, Singapore, and Sweden. Thirteen worked in formal K12 education, while 11 were from universities. Fifteen identified their primary role (related to IPY) as being a formal K12 teacher; 13 were research scientists (see Figure 6). Of the K12 teachers, the distribution of grade levels taught was fairly even (5 grades 3-5; 4 grades 6-8; 7 grades 9-12).

Two questions asked about areas of interest and expertise with regard to scientific research and education. The most frequently cited research areas of research interest were Antarctica, Climate, Ecosystems, and the Arctic, all with 19 or more selections. Areas with between 10 and 15 selections were Both Poles, Geology, History of Polar Regions, Biology, and International Programs.

Responses to the inquiry about areas of education and outreach interest and expertise were led by Integrating Research, Education, and Communications with 27 selections. Formal K12 Education received 22 selections, and Informal Education received 15.

Three questions asked whether respondents lived in the Arctic or had visited the Arctic or Antarctica. When asked if they were an Arctic resident, four of the 37 respondents answered “yes.” Of the 32 responding non-residents, 15 had never been to the arctic and 17 had. Twenty-four out of 38 respondents had been to Antarctica, and 14 had not.

Two questions addressed interest levels for the proposed workshop breakout groups. Of the 11 proposed groups, respondents were asked to select three to focus on. By far, the most popular group was K12 Education (27 selections), with International Collaborations, Field Experience, Young Scientists, Reaching Diverse Audiences receiving 16, 14, 12, and 10 votes respectively. Other proposed groups were Science Exhibits & Events (9 selections), Data Communication (8), Art (7), Funding Opportunities
When asked to select one top choice among the breakout groups, 13 out of 39 selected K12 Education and five selected International Collaborations. Other options received two or fewer votes. Later visitation data reflected the top two from this survey—KGrad Education and International Collaboration were the most-visited topic-based rooms at the workshop.

In response to an open-ended inquiry about respondents’ reasons for participating in ICE, 39 replied. Of these, thirteen specifically mentioned K12 applications, nine described a desire for better understanding of IPY education and outreach efforts, eight specifically mentioned an interest in public outreach, five mentioned collaboration opportunities, and four emphasized international cooperation.

The question asking what respondents hope the earth science education and IPY communities achieve as a result of the workshop had 38 responses. Many respondents replied with a general comment about what they thought the top education or communication priority was. Twelve specified formal K12 education applications; eight emphasized getting essential information out to the general public; nine described achieving a better understanding of IPY research and outreach efforts; five hoped the workshop would facilitate development of some concrete action plans; and three looked to forming effective collaborations with other participants.

When asked what participants hope to achieve for themselves from the workshop, 38 replied. Many explained that they were looking forward to networking with other participants to gain a better understanding of the IPY work being done (14) or to gather ideas for their own work (13). Several mentioned their desire to discover how to make the most of their contribution to IPY. Two hoped to find funding sources for their projects.

Another question asked participants what they hoped to be the results of the workshop within their organization. Three main themes emerged from their 37 responses—increasing within their organization awareness of and motivation to participate in IPY and IPY education and outreach efforts; increasing understanding within the IPY education and outreach community of the resources offered by their organization; and developing new ways to present IPY information to students.

A multiple-choice question asked about respondents’ information sources for polar science information. The most frequently-selected source was online resources, followed by conversations with colleagues (see Figure 7). The eight one-response items were specified under “Other.”
The next open-ended question asked respondents to “describe three to five basic concepts that should be conveyed about the polar regions.” The extensive list compiled from 37 responses was posted to the workshop Meeting room thread entitled “Basic Concepts for Polar Literacy Framework” as a starting-point for a discussion. During the workshop, 84 posts were made on this thread, making it one of the two most active threads (not counting the “Introductions around the room” thread) in this room.

The following questions asked for a similar list of the most common misconceptions about the poles. The list generated from the 35 responses was used as the first post to another thread in the Meeting room, entitled “Addressing Misconceptions.” This was also an active thread, with 86 posts during the workshop. The most commonly-mentioned misconceptions were that the poles were too remote to be important to the rest of the planet, that nothing lives in polar regions, and confusion about where penguins and polar bears live.

The 38 responses to a similar question (“What are the connections between polar science and everyday life that should be highlighted in education and communication efforts?”) were used as the starting-point for another thread in the Meeting room entitled “Connections to Daily Lives.” There were 20 posts to this thread during the workshop.

The final question on this instrument was “What else would you like the organizers of this workshop to know?” There were 17 responses. Most respondents reiterated what they thought the highest priority goals for the workshop were.
Registration Survey Results Overview

The brief registration survey was posted near the log-in window for the conference; it included seven questions and was responded to by 42 participants.

The most common role selected was Scientist, followed by Outreach Specialist and Informal Educator. Eleven respondents selected “Other”; these responses are included in Figure 8.

![Primary Role Related to IPY](image)

Figure 8. Primary role related to IPY.

The most commonly selected areas of research interest or expertise were Climate and The Arctic, with 20 and 18 selections respectively (see Figure 9).
Figure 9. Research areas of interest or expertise.

The most commonly selected areas of outreach and education expertise (see Figure 10) were K12 Education and Integrating Research Education and Communication (23 selections each) and Informal Education (22 selections).
Figure 10. Outreach/education areas of interest or expertise.
Post-Workshop Survey Results Overview

The post-workshop survey was posted on the conference; in addition, emails were sent out to all participants encouraging them to complete the survey. Most of the multiple choice questions in the post-workshop survey were answered by 39 respondents (one had 38 respondents).

The survey asked participants what their title was. Out of 35 respondents, nine cited a director, coordinator, or chairperson position; eight identified their titles as teachers, and five as professors.

Thirty-six respondents identified their organizations; ten were from universities and nine were from schools. Other organizations included governmental agencies.

Thirty-eight participants gave their countries; 30 were from the USA, four from Canada, two from Germany, and one each from Argentina and Australia.

Thirty-nine respondents replied to a request for their primary role related to IPY. Scientist was the most common response at 12, with K12 next at 11 responses. See Figure 11.

<table>
<thead>
<tr>
<th>Primary role related to IPY: (check all that apply)</th>
<th>Counts</th>
<th>Percents</th>
<th>Percentages</th>
</tr>
</thead>
<tbody>
<tr>
<td>Scientist</td>
<td>12</td>
<td>32.8%</td>
<td></td>
</tr>
<tr>
<td>Formal K-12 teacher</td>
<td>11</td>
<td>28.2%</td>
<td></td>
</tr>
<tr>
<td>Informal educator</td>
<td>8</td>
<td>20.5%</td>
<td></td>
</tr>
<tr>
<td>University faculty</td>
<td>7</td>
<td>17.9%</td>
<td></td>
</tr>
<tr>
<td>Graduate student</td>
<td>5</td>
<td>12.8%</td>
<td></td>
</tr>
<tr>
<td>Outreach specialist</td>
<td>5</td>
<td>12.8%</td>
<td></td>
</tr>
<tr>
<td>Government personnel</td>
<td>4</td>
<td>10.3%</td>
<td></td>
</tr>
<tr>
<td>Funding organization representative</td>
<td>2</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Media representative</td>
<td>2</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Undergraduate student</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>NGO representative</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>advisor for conservation education organization</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Polar Bears International educator</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>artist</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Chair of Antarctic Sea ice in IPY, project #141</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td><a href="http://www.ipy.org">www.ipy.org</a></td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Earth science systems curriculum and space science curriculum consultant</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>9</td>
<td>23.1%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 11. Primary role related to IPY.

Thirty-nine respondents provided the research topic areas of interest or expertise. The most common area selected was the arctic (20 selections), followed by Antarctica (18) and Climate (17). See Figure 12.
<table>
<thead>
<tr>
<th>Topic</th>
<th>Counts</th>
<th>Percent</th>
<th>0</th>
<th>100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arctic</td>
<td>20</td>
<td>51.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Antarctica</td>
<td>18</td>
<td>46.2%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Climate</td>
<td>17</td>
<td>43.6%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Both-poles and global linkages</td>
<td>15</td>
<td>38.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>International programs</td>
<td>15</td>
<td>38.5%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ecosystems</td>
<td>14</td>
<td>35.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ice processes</td>
<td>9</td>
<td>23.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Modeling</td>
<td>9</td>
<td>23.1%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Geology</td>
<td>7</td>
<td>17.9%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Biology</td>
<td>6</td>
<td>15.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>History of Polar Regions</td>
<td>6</td>
<td>15.4%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physics</td>
<td>5</td>
<td>12.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Solar-terrestrial physics</td>
<td>5</td>
<td>12.8%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Chemistry</td>
<td>4</td>
<td>10.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polar societies</td>
<td>4</td>
<td>10.3%</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
<td>56.4%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Figure 12. Research topics of interest.**

The most commonly selected areas of interest in outreach/education from the 39 respondents were K12 Education (24 selections), Integrating Research, Education, and Communications (19), and Informal Education (15). See Figure 13.
An open-ended question asked participants what they considered “the most important decisions made in the workshop with regard to integrated communication and collaboration on IPY education, outreach, and communication topics.” Thirty-four people responded to this question. Of these, eight didn’t think any decisions had been made that they were aware of. Others summarized the highlights from their perspective in various ways.

I’m not sure that, in the end, there were decisions made that were clear and concise.

I believe that over the course of the two weeks a huge spread of institutionalized forms of focus on polar study was uncovered. Many “players” expressed more than just their identity and came to voice their aspirations. This piece is critical to successful future collaboration. The most important decision was less of a statement and more of an experienced realization that collaboration between the past and the future can be supported by new forms of technology. Understanding the form of the blend to serve everyone is a challenge, but by working with the emerging communication element over the two weeks shapes began to form. The decision therefore would be to continue using the tool.

Twelve respondents mentioned the value of the networking they had experienced during the workshop rather than any decisions that were made. The concrete outcomes that were mentioned frequently (nine times) were the lists of misconceptions and polar concepts that were developed by some of the breakout sessions; having a concrete list to build on was important to a number of participants.
When asked what IPY events they learned about at the workshop, 27 participants responded. Twelve of these said there were many events they learned about, while four said none at all. Two people commented they learned about the timeline of IPY overall, and six mentioned specific events (half of these specified the Students on Ice program).

There was a plethora (of new IPY events) that was astounding. —participant

Another question asked participants what IPY funding opportunities they intend to pursue that they discovered at the workshop. Sixteen respondents said they hadn’t discovered any funding opportunities. Two said they had found a number of opportunities. One said they have modified their ideas for proposals based on information at the workshop. Two mentioned NSF, and one mentioned NASA.

I knew of the NSF announcement of opportunity for IPY education prior to the workshop, but our ideas for proposals have undergone significant modification by the workshop contacts. One example of this is the need for on-line, as opposed to face-to-face, courses in polar sciences for the professional development of teachers.—participant

The survey asked participants to identify collaboration and partnership opportunities they learned about at the workshop. Thirty participants responded, of whom 19 listed specific partnership plans (Students on Ice and Windows Around the World were each mentioned twice). Two respondents said they hadn’t found any partnerships, and four said they had made many (but didn’t mention specifics).
Among the 39 respondents to the question regarding which workshop resources they plan to use regularly after the workshop, the most popular item was links to websites (31 selections). College of Exploration Online Polar Lectures and Information About Programs were the next most-selected options, with 22 and 21 respectively. See Figure 14.

<table>
<thead>
<tr>
<th>Resource Description</th>
<th>Counts</th>
<th>Percent</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Links to websites</td>
<td>31</td>
<td>79.5%</td>
<td></td>
</tr>
<tr>
<td>College of Exploration Online Polar Lectures</td>
<td>22</td>
<td>56.4%</td>
<td></td>
</tr>
<tr>
<td>Information about programs</td>
<td>21</td>
<td>53.8%</td>
<td></td>
</tr>
<tr>
<td>Calendar</td>
<td>19</td>
<td>48.7%</td>
<td></td>
</tr>
<tr>
<td>Polar content information</td>
<td>19</td>
<td>48.7%</td>
<td></td>
</tr>
<tr>
<td>Teacher-related resources (e.g., lesson plans, standards)</td>
<td>18</td>
<td>46.2%</td>
<td></td>
</tr>
<tr>
<td>Tools or technologies discussed</td>
<td>10</td>
<td>41.0%</td>
<td></td>
</tr>
<tr>
<td>Data discussed in sessions</td>
<td>15</td>
<td>38.5%</td>
<td></td>
</tr>
<tr>
<td>Maps presented</td>
<td>13</td>
<td>33.3%</td>
<td></td>
</tr>
<tr>
<td>Theme/misconception discussions</td>
<td>2</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Collaboration opportunities</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>contacts for participants</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>hearing people talk</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>I will use everything!</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>i would hope that a contact list of participants will be generated and distributed</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>5.1%</td>
<td></td>
</tr>
</tbody>
</table>

Figure 14. Workshop resources that participants plan to use regularly in the future.

When participants were asked to identify specific resources or information they found the most helpful, 28 responded. Six specified the resource links; 11 said that networking with other participants was the best resource; two mentioned the misconception discussion; and three specified the online presentations/lectures.

Open-ended responses to the resources or information participants found the most useful included “people’s stories” and references to the popular HipBone game.

*The hipbone activities and discussions...what a great way to set up and view connections.*

*Living in the metro New Orleans area...the hip bone game beginning with the Antarctic-New Orleans connection is something I have shared with lots of science and math teachers in the past 10 days.*

—comments on the hipbone game from participants
Other participants valued the materials collected in the Resource area, which was developed to facilitate the sharing of information resources, such as existing polar-science education materials and related websites.

Links to polar lectures in the Resource room were cited as valuable as well.

Twelve thematic-focused breakout “rooms” were established for the workshop, but several breakout rooms never reached a critical mass of participants.

Although there were many participants overall, there was a lack of focus on specific goals and outcomes targeted within many of the discussions. The limitations that resulted from too much going on at once and the lack of focus were cited a number of times in the survey.

The second week seemed to lose some steam and it was much harder to follow what was going on. I don’t know if some “rooms” should have been closed so that people...focused (more) on week 2.

There were too many items to follow and I feel that many participants did not follow some of the items due to the complexity of the structure.

I was simply unable to keep current with the wonderful discussions. There was so much to take in, I was afraid to respond to any one comment until I read them all knowing that what I wished to say might have already been said in a later entry. It was amazing just to lurk and learn on the side.

There were too many places. The conversations in many of the rooms overlapped so that if you were participating in the wrong room, it was easy to miss key stuff. Streamline!!!

I really enjoyed this workshop. I found that I could only follow a few streams at a time and when I explored other ones, the work being done there would have “cross pollinated” and improved our work. I think some opportunities were missed. However, I don’t want the criticism to diminish the positives, only I wished they could have been even more positive.

—comments from participants on the busy nature of the workshop
A number of participants were hesitant about whether the objectives of the workshop had been achieved.

Maybe I missed the area that identified the desired outcomes for this workshop. A lot is going on, which is important, but I don’t feel a sense of direction yet. Perhaps IPY is too big for my brain to get around, but I participated in the Bridging (the Poles) workshop in Washington and the desired goals of IPY seem to be right on track. Just seems the pathway to get there hasn’t been revealed or we haven’t found it together yet.

I did learn from the exchange of ideas; but I’m not sure what was accomplished for the time that was invested. It didn’t seem to me that we stayed “on’-track” with the stated purpose of the workshop.

I was looking for agreement on 5-6 concepts that we could start developing unified messages around. I am a bit worried that without a unified focus we will either overwhelm the education community and Arctic residents, or we will fall short of the potential to raise awareness using IPY as the hook. I was looking for new contacts and ideas—the forum was beneficial in that area—new names that I will follow up with, new programs (to me) that are already out there that I would like to follow up with, links to already existing lesson plans that fit our program.

I find myself wondering how far the “products” from the conference got in development? Will there be access to those still? Will the compilation be completed? Can we continue to work on this as a group?

I was never sure of the direction where it was heading and what the outcomes should be. I guess I am a goal oriented person and I found that lacking or unclear.

—comments from participants on outcomes and products

Some participants, however, found the diversity of discussions was ultimately worthwhile.

The wide range of participants led to such a mixture of viewpoints that all of the discussions were extremely interesting. However, it must be mentioned that everyone appeared to express an under(lying) concern over global warming and what is happening to our polar regions.

—comments from participants

When asked which breakout rooms that respondents would participate in after the
workshop, the most common selection was IPY Plans (25 selections). The 39 respondents also selected K-Graduate Education quite frequently (23 selections). See Figure 15.

<table>
<thead>
<tr>
<th>Which breakout rooms would you participate in if this online space were kept open after the workshop? (check all that apply)</th>
<th>Counts</th>
<th>Percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPY Plans</td>
<td>25</td>
<td>64.1%</td>
</tr>
<tr>
<td>K-Graduate Education</td>
<td>23</td>
<td>59.0%</td>
</tr>
<tr>
<td>Funding</td>
<td>17</td>
<td>43.6%</td>
</tr>
<tr>
<td>Field Experiences</td>
<td>16</td>
<td>41.0%</td>
</tr>
<tr>
<td>Education technology and digital media</td>
<td>16</td>
<td>41.0%</td>
</tr>
<tr>
<td>Informal Education</td>
<td>15</td>
<td>38.5%</td>
</tr>
<tr>
<td>Young Scientists</td>
<td>15</td>
<td>38.5%</td>
</tr>
<tr>
<td>Diverse Audiences</td>
<td>11</td>
<td>28.2%</td>
</tr>
<tr>
<td>Data communication</td>
<td>10</td>
<td>25.6%</td>
</tr>
<tr>
<td>Art Gallery</td>
<td>8</td>
<td>20.5%</td>
</tr>
<tr>
<td>Arctic Residents</td>
<td>7</td>
<td>17.9%</td>
</tr>
</tbody>
</table>

Figure 15. Breakout rooms participants would use after the workshop.

Overall, respondents to the final survey indicated their expectations for the workshop were met fairly well (see Figure 16). Out of 39 respondents, 24 responded they strongly agreed or agreed with the statement that their expectations were met.

<table>
<thead>
<tr>
<th>My expectations for this workshop were met.</th>
<th>Counts</th>
<th>Percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>9</td>
<td>23.1%</td>
</tr>
<tr>
<td>Agree</td>
<td>15</td>
<td>38.5%</td>
</tr>
<tr>
<td>Neutral</td>
<td>11</td>
<td>28.2%</td>
</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>10.3%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Figure 16. Whether participants’ expectations for the workshop were met.
Thirty-nine respondents replied to whether or not they agreed that the amount and type of interaction among workshop participants satisfied their needs. Twenty-nine said they either agreed or strongly agreed. See Figure 17.

<table>
<thead>
<tr>
<th>The amount and type of interaction among participants satisfied my needs.</th>
<th>Counts</th>
<th>Percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>7</td>
<td>17.9%</td>
</tr>
<tr>
<td>Agree</td>
<td>22</td>
<td>56.4%</td>
</tr>
<tr>
<td>Neutral</td>
<td>9</td>
<td>23.1%</td>
</tr>
<tr>
<td>Disagree</td>
<td>1</td>
<td>2.6%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Figure 17. Whether the workshop participant interaction met respondents’ needs.**

Regarding whether online interactions with other participants enabled respondents to make connections they will continue in the future, 28 of the 39 respondents said they agreed or strongly agreed with this. See Figure 18.

<table>
<thead>
<tr>
<th>Online interactions with other participants enabled me to make connections that I will continue to use in the future.</th>
<th>Counts</th>
<th>Percents</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
<td>10</td>
<td>25.6%</td>
</tr>
<tr>
<td>Agree</td>
<td>18</td>
<td>46.2%</td>
</tr>
<tr>
<td>Neutral</td>
<td>8</td>
<td>20.5%</td>
</tr>
<tr>
<td>Disagree</td>
<td>3</td>
<td>7.7%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Figure 18. Whether workshop participants plan to continue connections made with other participants.**

Out of 38 respondents, 27 replied that they agreed or strongly agreed that the navigation through the workshop was satisfactory and easy to learn. See Figure 19.
The asynchronous web conferencing tool deployed by the College of Exploration using Caucus software was new to many of the participants. A number of participants shared their insights into their experience with the workshop in the final survey.

The final open-ended question on the survey asked participants for any additional comments on ICE or suggestions for future workshops. Twenty-seven people responded. Five of these simply expressed their thanks for the workshop. Thirteen described in slightly different ways the main problem they saw with the workshop—that there was an overall lack of focus that was a problem; they cited too many participants, too many off-track discussions, trying to do too much, and lack of coordination or control by managers to keep discussions on track towards some concrete goals. The participants who discussed this problem were mainly positive about the workshop, but felt strongly that any future efforts would be improved by better moderation, clearer goals, limited participation, and more focus in the topics.

Participants were asked whether they would be willing to be contacted in the future for long-term assessment of the workshop impacts; 37 of the 39 respondents said they would be willing. See Figure 20.
Follow-up Comments and Reflections

Several workshop participants sent follow-up comments about the workshop in reply to an email that inquired about their opinions in retrospect. One participant reflected on the contacts made during ICE that will be useful in communications work.

The ICE workshop was useful in giving me ideas on how to involve northern residents in our research, as I am in charge of ‘communications’ for our IPY project (in addition to doing my own research). It also put me in contact with Geoff Green of ‘Students on Ice’, and I may be able to participate in one of his polar cruises as a visiting glaciologist. I was also able to see what plans are in the works for Young Scientists, and to get information on workshops available for young scientists/new professors to help develop our careers and involve us more with the public.

—participant

Another respondent described participation in an NSTA proposal with contacts made at ICE.

I’ve gone in with a group that submitted a proposal to NSTA’s national convention next year. We want to present a variety of activities on how to use the IPY. My role will be presenting a plan for monitoring the length of day and sun angle at various places around the planet.

—participant reflections on ICE
A participant described international contacts made at the workshop and plans for future funding opportunities. This respondent suggested follow-up workshops that would be smaller and have a tighter focus.

Because of ICE, we started thinking about the importance of working with other countries and will be trying to find a group in the States to partner with and support with funds from the exhibition. There wasn't time to get into funding during the workshop, but we plan on checking the funding area of the workshop for ideas over the summer.... So, for me, the workshop, being my first such workshop, was a fabulous introduction, inspired me to be more involved with IPY, and will be a great resource that I will continue to access.

—participant reflections on ICE

Another participant noted that although she was reluctant to do more than read the exchanges during ICE, she came away from the workshop with resources she plans to use in her region.

The workshop provided me with several contacts to suggest to teachers in our projects and information and sites to share with members of science organizations in state through [email lists] and newsletters. The hip-bone discussions were very enlightening.

—participant reflections on ICE

Relationships and a better understanding of the IPY community were cited by a respondent as being valuable in program development work.

I have developed relationships with folks I met during the workshop and it most definitely helped to refine my thinking on program development in the polar regions.... Gaining a better sense of the background/historical perspective and getting a feel for what the polar researchers and educators were/are thinking and/or already doing was most helpful.

—participant reflections on ICE
External Evaluation

Dr. Howard Walters of Ashland University provided external evaluation support for this project. Below is his written report of his analyses.

Introduction

The College of Exploration (TCOE) has facilitated with increasing complexity a series of online communities and meetings over the past decade. These visually and conceptually rich workshops have involved both small planning groups and large, international learning communities. Further, they have been implemented for, by, with, or in contract to, many of the significant agencies and institutions in the science community including NASA, NOAA, NSF, CORE, JOI, CIRES, COSEE, The National Geographic Society, and numerous government line offices and public/private partnership organizations, universities, and professional associations.

A review of the partnerships and participants for these workshops through the online archives on the TCOE web site suggests that TCOE is increasingly viewed as the science communities’ interagency communications and planning “arm.” These dialogic communities—which include visual imagery, streaming video, and links to archival supporting documents—have been implemented by The College of Exploration for nearly a decade. Prior published analyses of TCOE workshops further supports that numerous science and education constituencies return to TCOE repeatedly for professional development along a variety of disciplinary lines, and increasingly for organizational planning and development, and localized through national and international program evaluation and assessment activities.

The premise of CoExploration online communications spaces is that transparent discussion and planning, brainstorming and networking have the potential to involve individuals, diverse groups and agencies/institutions in a creative, cognitive process.
The online space, in short, becomes the “physical environment” in which communities develop, learn, grow, and communicate. To the extent this premise is actualized, it should be possible through holistic examination of a community to observe the emergence of a tightly focused cognitive structure out of what is initially serendipitous interaction and dialog. The questions which guided this short examination of the ICE workshop community spaces are therefore: does a cognitive structure emerge over time in the ICE workshop, are there interactions across structural elements, and could the structure be replicated in a physical space. This final question is an important consideration as the above noted agencies continue to engage with TCOE for community development, planning, and content diffusion.

An initial concept map which captures the ideas associated with TCOE philosophy and planning activities which most directly link TCOE history to the current ICE initiative is reflected in figure one.

**Figure 1. TCOE linkage to ICE initiative.**

**Method**

The researcher obtained hard copies of all of the dialog in each of the discussion and planning spaces of the ICE community. This allowed the researcher to reduce the community to an artifact for examination as narrative data and to simultaneously
physically compare community elements including date and time of interactions, membership in rooms and participation in discussions, similarity of narrative across multiple rooms, and manual organization and reorganization of the data to identify common themes and cognitive units. This approach conforms to typical methods for managing narrative data in the social science research discipline. It is noted that an organizational structure and agenda were contained in the “Backroom” and “Committee Room” spaces, and included clearly at the entry points to the virtual space. These were initially ignored by the researcher in an attempt to identify what actually occurred in the community as opposed to prior conceptions of what should have occurred. This allows a view of actual structure instead of perceived structure in the event a gap exists between these two constructs.

**Analyses and Findings**

Preliminary analyses followed the structural lines which emerged through the facilitation activities of TCOE personnel in managing the community by following the dates and times of actual postings and narrative by participants instead of the spatial map and item creation postings provided by TCOE personnel. In this approach, a clear entry point, movement through the space, and engagement/disengagement/reengagement was observed by participants. This flow through the space generally followed the path provided by the facilitators—but was frequently reinterpreted by participants as they created new spaces themselves, crossed content between spaces, and temporarily disengaged for private conversation or travel.

There was, however, a clear link and path along the lines of the community facilitation activities. This is an important observation—as the perception that online community dialog is a cognitive “free for all” that moves amorphously based on the whims of participants is utterly inaccurate. The planning spaces for project principals reflects that TCOE personnel engaged prior to and throughout the workshop to
understand the workshop goals, and then provided active facilitation and management of the conversations to prompt cognitive movement toward goal attainment. Every dialog in every room begins with initial prompting by a TCOE representative to structure the discussion, and the narrative of nearly every room included frequent reorienting prompts by these individuals. These reorienting prompts frequently cross-related community discussion spaces, encouraged integration of content and ideas, and redirected conversation when it moved off-task. Interestingly, this social role mirrors physical meetings but is more nuanced and didn’t appear to possess the linear and authority-driven or “podium focused” characteristic of a physical meeting/discussion which typically limits individualized discussion contributions, can marginalize less forceful speakers (who may be the most creative participants), and can unnaturally constrain the use of time. The active management of the space becomes nearly imperceptible, but includes elements such as:

- Response 7:15 Peter Tuddenham, March 27, 2006, 04:50—Now please review item 11 and help weave the threads into a more complex and complete tapestry of our collective contributions.
- Response 11:31 Peter Tuddenham, March 20, 2006, 15:50—I think we may find ourselves having debates about categorization and not the content if we are not careful. The ten themes are a best effort reflection of the contributed content in the pre-workshop survey and also the result of extensive discussion last week.
- Response 13:25, William Bragg, March 30, 2006, 08:13—Note: possibly with “extremes” we could add “variability” – referring to Earl B.’s note a while back (in one of the items).…so, maybe like: “Extremes/Variability” (and/or unpredictability).

The repeated observation in the narrative of the active management of the community provides perhaps an explanation for the focused cognitive structure which did emerge as discussed below. This observation supports the reality that effective meetings do not emerge without facilitative support as was observed here.

Moving from the organizational and design level of the ICE community, the opening focus question to guide the search for a cognitive structure in the ICE
community was “what is the workshop, what are its primary structural parameters, and what is the shape of the virtual geography of the environment?” This shape emerges as depicted in figure two below. This structure could not evolve in a physical space due to the limitations of interactive capability and multitasking imposed on individuals in a physical room. Individuals simultaneously “jumped” from virtual room to virtual room, following separate threaded conversations without pausing in speech or in thought—thereby maximizing their cognitive capabilities that would be otherwise limited by temporality and the social convention of “not speaking when someone else is” in a face to face meeting space. The gaps and overlaps in thought—which would have been missed and which would have created misunderstanding in face to face meeting—were mitigated because the narrative was immediately archived. Individuals could quickly scan backwards in time to read what they missed while in another space or typing their own thoughts. This observation demonstrates the creative use of time and overlapping discussions which are possible in virtual community but entirely not possible in face to face. Narrative which demonstrates this phenomena include: “I'm sorry I was late arriving in the workshop, but I've read the discussion I missed and....” Another discussant stated: “I left the room for an offline discussion with X about the discussion in item 2 and I need to catch up on the conversation.” A final example: “Let’s continue this conversation offline in real time.” These ideas are cognitively irrational as related to physical meeting space, but are becoming conventional for virtual communities. These narratives further reveal the emergence of new conceptual models for meetings, discussions, and communities which are not dependent on temporal or geographic similarity. They also reveal the development of restricted language in a manner associated with physical community.
Figure 2. Holistic map of ICE Community Narrative.

The concept map presented as figure two above is highly complex and frequently
Recursive—with linkages that become web-like. Nevertheless, it remains highly simplified due to constraints in this evaluative exercise. Time and resources would highlight further connectivity based on the external linkages that were frequently inserted into the discussion narrative.

In simple terms, the path through the community’s environment was strongly influenced by planning decisions apparent in the Backroom Office and Committee Room areas. Dialog there indicates incremental revision to the workshop spaces, goals and objectives, and structural definitions and parameters prior to “going live.” The Welcome Space provided clear details on how to interact via the technology and software in the virtual community. This Welcome Space served as a hub conceptually and was associated with a number of “housekeeping” sorts of materials such as calendar spaces, resource links, and extraneous but related information that some participants found very helpful based on narrative content.

The three additional hubs which are visible in this cognitive structure seem to be Audiences and related issues, Content and related issues, and Dissemination/Communication/ Technology and related issues. These hubs are identified by movement of specific participants or groups of participants through these spaces and by the cognitive and content flow of the narrative in the spaces. It is noted that the planned path and facilitative structure includes these three hubs, but not in these organizational or labeled formats. This supports the conclusion that the participants were empowered to reinvent the community space, but within the limits of the facilitation. The facilitation accommodated free-choice learning and participation, while holding participants to the goals of the workshop planning group and the original NSF proposal.

Conclusion

While this paper reflects only a brief and concise analysis “across the surface” of
the ICE community narrative, it undertook to answer fairly basic questions. Does a
cognitive structure, i.e. a logical thought path, emerge out of the narrative in the virtual
spaces connected to the workshop, are there interactions across the structure which
indicate authentic community, and could the community as it emerged exist in real
space?

With respect to the first question, a cognitive structure did emerge which
generally followed the goals of the planning committee but grew more complex, less
linear, and more social over the time window of implementation. The structure reflects
the facilitative management of TCOE—with significant data to support a strong, “hands
on” approach to implementing this project. This planned structure kept participants
focused on the overall goals, but within a virtual environment that accommodated
creative reinvention of the environment.

The narrative demonstrates interactivity across the structure in both participation
and content development. This interactivity contributed to a rich content and diversity in
the types and numbers of discussants—although created challenges for the facilitators
to maintain focus across the weeks of implementation. The complexity raised
awareness of several distinct constructs such as holistic knowledge, historical
perspective, sense of place, audience diversity, and inter-relationships among science
disciplines which, though in part discussed in the pre-planning stages and rooms, took
on new importance and life in the community. The crossing lines in figure two above as
the web emerges signify the interactivity and select linkages in the narrative space.

Finally, with respect to the feasibility of this community narrative emerging in real
space—it seems clear that it could not for several reasons observed in the participant
behavior and narrative content. First, the overlapping thoughts in the different rooms
and the overlapping times at which the comments were posted, along with the iterative
re-reading required as individuals entered and left the spaces is not possible in real
meeting space. If one leaves the room, the discussion continues and they cannot contribute. Numerous incidents are recorded in the narrative of participants leaving and returning to re-read, catch up, reengage, and continue conversational threads. Second, the technological capability of participating in multiple conversations at the same time in different spaces is rationally not feasible in real space—and yet seems within the cognitive capability of human beings. The virtual web community may in fact, as observed in other research, more closely mirror the cognitive “wiring” of the human brain and its capabilities than the linear, single topic approaches to real space narrative and community dialog. One area of further research on this community space that is probably warranted is to pursue the evolution of virtual space as a simultaneous evolution of social convention and communications to use machines as extensions of the human brain—along the lines of Novak and Gowen’s work at the Institute for Human and Machine Cognition. Finally, there were apparently travel concerns among planning committee members, and scheduling conflicts for numerous participants during the community meeting. Real space meetings require temporal and geographic proximity that would not accommodate these types of travel needs. From this standpoint, numerous participants would have missed key elements of the dialog were this a real space experience.
References


Appendix I

Survey Instruments

This appendix includes the three questionnaire instruments. The appearance of these surveys is not identical to that of the Caucus (online workshop) presentation; however, the wording is identical.

Pre-workshop Questionnaire

In preparation for the upcoming online workshop, we would like to know more about the workshop participants and their expectations for the workshop. Would you please take a few minutes to respond to the questions? We will provide a summary statement of the responses at the start of the workshop. Thank you.

Name ____________________
Title ____________________
Organization ____________________
Country ____________________
Email ____________________

Primary role related to IPY-check all that apply:
   ___ Scientist
   ___ Funding organization representative
   ___ Informal educator
   ___ Outreach specialist
   ___ Formal K-12 teacher
   ___ Media representative
   ___ University faculty
   ___ Government personnel
   ___ Undergraduate student
   ___ NGO representative
   ___ Graduate student
   ___ Other:

If you are a K-12 teacher, what grade(s) do you teach - check all that apply?
   ___ K-2
   ___ 3-5
   ___ 6-8
   ___ 9-12

What are your areas of interest, research, or expertise?
RE: Research Topics
   ___ Arctic
   ___ Ecosystems
   ___ Modeling
   ___ Antarctica
   ___ Economic issues
Paleoclimatology
Biology
Geology
Physics
Both-poles and global linkages
History of Polar Regions
Polar societies
Chemistry
Ice processes
Social science
Climate
International programs
Solar-terrestrial physics
Other:

What are your areas of interest or expertise?
RE: Outreach/Education Topics
___ Informal education
___ Communication infrastructure
___ Data tool development
___ Formal K-12 education
___ Integrating research, education, and communications
___ Online resource creation
___ Undergraduate education
___ Media information
___ Graduate education
___ Data dissemination
___ Other:

Are you an Arctic resident?
___ Yes
___ No

If not a resident, how many times have you visited the Arctic region? ____________________

And, how many times have you visited the Antarctica region? ____________________

How long have you been aware of the International Polar Year?
___ Less than 1 month
___ 1-6 months
___ 7-12 months
___ More than 1 year

Please describe your experience in the polar regions. ____________________

Which breakout theme(s) would you like to focus on? (PLEASE CHOOSE 3)
___ Digital Media
___ Young Scientists
___ International Collaborations
Which theme from above would be your first choice? ____________________

What are your reasons for participating in this workshop? ____________________

What do you hope the Earth science education and the IPY communities achieve as a result of this workshop? ____________________

What do you hope to achieve from this workshop for yourself? ____________________

What do you hope to achieve from this workshop for your organization? ____________________

How do you currently gather general information about polar science topics (check all that apply)?
___ Professional conferences
___ Newspapers
___ Email lists
___ Professional journals
___ Popular magazines
___ Conversations with colleagues
___ Television, Radio
___ Online resources
___ Other:

Please describe three to five basic concepts that should be conveyed about the polar regions (i.e., that a "polar literate" person should understand). ____________________

What are the key connections between polar science and everyday life that should be highlighted in education and communication efforts? ____________________

What have you found are the most common misconceptions about the poles?
____________________

What else would you like the organizers of this workshop to know? ____________________
Registration Questionnaire

Primary role related to IPY - check all that apply:
___ Scientist
___ Informal Educator
___ Formal K-12 Teacher
___ University Faculty
___ Undergraduate Student
___ Graduate Student
___ Funding Organization Representative
___ Outreach Specialist
___ Media Representative
___ Government Personnel
___ NGO Representative
___ Other

What are your research areas of interest and expertise? Check all that apply.
___ Arctic
___ Antarctica
___ Biology
___ Both Poles and Global Linkages
___ Chemistry
___ Climate
___ Ecosystems
___ Economic Issues
___ Geology
___ History of Polar Regions
___ Ice Processes
___ International Programs
___ Modeling
___ Paleoclimatology
___ Physics
___ Polar Societies
___ Social Science
___ Other

What are your outreach/education areas of interest or expertise? Check all that apply.
___ Informal Education
___ Formal K-12 Education
___ Undergraduate Education
___ Graduate Education
___ Communication Infrastructure
___ Integrating Research, Education and Communication
___ Media Information
___ Data Dissemination
___ Data Tool Development
___ Online Resource Creation
___ Other

Audience(s) you are focused on: ____________________

If you are a U.S. K-12 teacher, what grade levels do you teach? Check all that apply.
If you are teacher outside the U.S. please tell us the ages of students you teach?
____________________

Is there anything else you would like the organizers to know? ____________________
Post-workshop Questionnaire

Thank you for participating in the workshop. We value your feedback on this survey. The response data will inform the development of future IPY EOC events. Any identifying information will be kept confidential.

Name ____________________
Title ____________________
Organization ____________________
Country ____________________
Email ____________________

Primary role related to IPY: (check all that apply)
___ Scientist
___ Funding organization representative
___ Informal educator
___ Outreach specialist
___ Formal K-12 teacher
___ Media representative
___ University faculty
___ Government personnel
___ Undergraduate student
___ NGO representative
___ Graduate student
___ Other:

What are your areas of interest, research, or expertise? (check all that apply)

RE: Research Topics
___ Arctic
___ Ecosystems
___ Modeling
___ Antarctica
___ Economic issues
___ Paleoecology
___ Biology
___ Geology
___ Physics
___ Both-poles and global linkages
___ History of Polar Regions
___ Polar societies
___ Chemistry
___ Ice processes
___ Social science
___ Climate
___ International programs
___ Solar-terrestrial physics
___ Other:

What are your areas of interest or expertise? (check all that apply)
RE: Outreach/Education Topics

___ Informal education
___ Communication infrastructure
___ Data tool development
___ Formal K-12 education
___ Integrating research, education, and communications
___ Online resource creation
___ Undergraduate education
___ Media information
___ Graduate education
___ Data dissemination
___ Other:

What do you consider to be the most important decisions made in the workshop with regard to integrated communication and collaboration on IPY education, outreach, and communication (EOC) topics? __________________

What IPY events new to you did you learn about at this workshop? __________________

What funding opportunities for IPY work did you discover at the workshop that you intend to pursue? __________________

What collaboration and partnership opportunities for IPY work did you discover at the workshop that you intend to pursue? __________________

Among the following list of workshop resources, which do you plan to use regularly after the workshop. (Check all that apply.)

___ Links to websites
___ Calendar
___ College of Exploration Online Polar Lectures
___ Teacher-related references (e.g., lesson plans, standards)
___ Information about programs
___ Polar content information
___ Data discussed in sessions
___ Maps presented
___ Tools or technologies discussed
___ Other:

Please identify the specific resources or information that you found most helpful. __________________

Which breakout rooms would you participate in if this online space were kept open after the workshop? (Check all that apply)

___ K-Graduate Education
___ Education technology and digital media
___ Informal Education
___ Data communication
___ IPY Plans
___ Arctic Residents
In the questions below, please elaborate on your perspective regarding your workshop expectations.

My expectations for this workshop were met.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

The amount and type of interaction among participants satisfied my needs.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

Online interactions with other participants enabled me to make connections that I will continue to use in the future.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

Navigation through the online workshop was satisfactory and easy to learn.

Strongly Agree    Agree    Neutral    Disagree    Strongly Disagree

Please use the space below to add any other comments you have, suggestions for future workshops, or any other ideas you would like to share with us.

May we contact you in the future for further feedback about your experience at this workshop in order to support assessment of long-term impacts?

___ Yes
___ No
Appendix II

Agenda

The original agenda for the ICE workshop is included here. The actual agenda evolved over time as the workshop progressed.

Day 1-3       (Friday 17 – Sunday 19 March)   Introductions, setting out expectations
Day 1          Recorded keynote address (David Carlson) and introductions; review of agenda
Day 2-4       Review of Bridging the Poles and Poles Together Workshop
Day 4-9       (Monday 20 – Friday 24) Collaboration and Communications Demonstrations (Horizon Wimba and other online tools) and Presentations
Day 4-5       Breakout groups engage and introduce, agenda setting
Day 7         (Thursday 23) Begin to conclude main discussion on top concepts.
Day 5-9       Continued breakouts
Day 10-11     (Saturday 25 – Sunday 26 March) weekend
              Summaries of weeks activities created.
              Prioritized list of concepts created.
Day 12-13     (Monday 27 – Tuesday 28) Breakout groups work on education related implications of the concept priorities.
              Recommendations on key educational messages and approaches for different audiences from break out groups.
Day 14-15     (Wednesday 29 – Thursday 30 March) Wrap up and next steps.
Day 16-19     (Friday 31 March - Sunday 2 April) - Final event/celebration and evaluations. Cafe discussions over the weekend as we wind down.
Day 20 Monday 3 April on --Switch to virtual community with volunteer facilitators.
Appendix III

The College of Exploration Survey Reports

Survey 1—Pre-Workshop TCOE Survey Report

ICE Pre-Workshop Survey

March 12, 2006

COUNTRY

<table>
<thead>
<tr>
<th>Country</th>
<th>%</th>
<th>#</th>
</tr>
</thead>
<tbody>
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<td>Albany</td>
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<td>1</td>
</tr>
<tr>
<td>Alberta</td>
<td>2.6%</td>
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<tr>
<td>Argentina</td>
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<td>1</td>
</tr>
<tr>
<td>Canada</td>
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<tr>
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ORGANIZATIONS

- Kennedy Jr. High School
- Singapore American School
- University of Colorado
- NOAA Climate Program Office
- Bren School of Environmental Research, University of California Santa Barbara
- National Academy of Sciences
- University of Massachusetts Boston
- Athabasca University - Canada's Open University
- Universities Space Research Association
- National Museum of Natural History (Smithsonian)
- College of Exploration
- Institute for Arctic and Alpine Research
- Foreman High School
- Exploratorium
- University of Alaska Fairbanks, Geophysical Institute
- TERC
- University of Southern California Sea Grant Program
- Swedish Research Council
- Center for Earth Observation Science - University of Manitoba
- University Centre in Svalbard (UNIS)
- Howard County Public School System
- Drexel University
- Heyworth High School/ NASA-JPL
- Cheddi-Jagan-Levis Production Co.
- Science Applications International Corporation
- Univ. California Los Angeles
- Temecula Valley Unified School District
- DeLong Middle School
- Woods Hole Oceanographic Institution
- National Space Science and Technology Center
- Fresno Unified School District
• CIERG
• Aleut International Association (AIA)
• Patriot Elementary School
• Arctic Quest
• Fowler Elementary School District/Sunridge Elementary School
• The College of St. Rose & South Colonie School District
• Peru Central Schools
• Rochester Middle School

PRIMARY ROLE RELATED TO IPY

Primary role related to IPY-check all that apply:

- Formal K-12 teacher
- Scientist
- Informal educator
- University faculty
- Outreach specialist
- Government personnel
- NGO representative
- Funding organization representative
- Media representative
- Alaska Native not-for-profit, permanent participant of...
- Artist
- Director, UAF and UArctic Office of IPY Education and...
- Education Consultant
- Education Coordinator working with K-12 teachers, etc.
- Education program developer/manager (undergraduate...)
- Freelance science writer, media producer
- Museum professional
- Polar geeks
- Specialist in bridging the scientific and educational c...
- Staff to US National Committee for IPY (science and...
- Undergraduate student
- Graduate student
- Other

* Note: Multiple answer percentage-count totals not meaningful.

GRADE LEVELS TAUGHT

If you are a K-12 teacher, what grade(s) do you teach - check all that apply?

- 3-5
- 6-8
- 9-12

* Note: Multiple answer percentage-count totals not meaningful.
### RESEARCH AREAS OF INTEREST AND EXPERTISE

<table>
<thead>
<tr>
<th>Research Topics</th>
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<tbody>
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<td>Arctic</td>
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<td>Both-poles and global linkages</td>
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<td>Geology</td>
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<td>History of Polar Regions</td>
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<td>Biology</td>
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<td>International programs</td>
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<td>Economic issues</td>
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<td>Ice processes</td>
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<td>Solar-terrestrial physics</td>
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*Note: Multiple answer percentage-count totals not meaningful.*
### EDUCATION AND OUTREACH AREAS OF INTEREST AND EXPERTISE

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<td>Internet web exchange</td>
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<tr>
<td>Professional development for pre- and in-service teachers</td>
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<td>Scientist-Teacher-Student Partnership</td>
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*Note: Multiple answer percentage-count totals not meaningful.

### ARCTIC RESIDENT

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NUMBER OF VISITS TO ARCTIC REGION

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<td>three times in Alaska</td>
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NUMBER OF VISITS TO ANTARCTIC REGION

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CHOICE OF BREAKOUT THEMES FOR FOCUS

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<td>Field Experience</td>
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<td>Young Scientists</td>
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<tr>
<td>Reaching Diverse Audiences</td>
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</tr>
<tr>
<td>Science Exhibits &amp; Events</td>
<td>23.1%</td>
<td>9</td>
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<tr>
<td>Data Communication</td>
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<tr>
<td>Engaging Arctic Residents</td>
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<tr>
<td><strong>Totals</strong></td>
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* Note. Multiple answer percentage-count totals not meaningful.

FIRST CHOICE FOR BREAKOUT THEME

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REASONS FOR WORKSHOP PARTICIPATION

What are your reasons for participating in this workshop?

- I want to be involved in planning for the IPY and I feel I bring a good mix of skills to the table.
- I think we have an amazing opportunity with the IPY coming up if we market it to the public. It is an incredible learning opportunity and I want to be part of spreading the word, especially to other international schools.
- Spread the word about IPY and the role of science in shaping our future.
- To participate in the development of a common framework that will focus IPY education outreach efforts and limited resources to maximize this opportunity to enhance the climate literacy of our planet’s citizens.
- International / interdisciplinary research and education.
- I, and my staff here at NAS, were among the original planners of IPY and we are doing everything we can to help it be a success.
- I am very interested in learning about K-12 educational opportunities and in creating collaborations to work on expanding my web exchange program. I especially want to learn about international opportunities as I would like to expand my program to other countries.
- Funding opportunities, partnerships, collaboration.
- I wish to develop a greater understanding of IPY resources and education needs as I explore future directions for the ESSE program, and look for ways that the ESSE community can participate and contribute.
• Increased knowledge of collaborative possibilities in relation to Arctic exhibition and educational materials
• Interest in Polar studies.
• I believe that the common public is not aware of all the concerns about the changing Polar Regions. I want to contribute to enhancing the communication of our knowledge about such concerns.
• I live and teach near Lake Michigan. I have presented on hydroeavests at the GSA National Convention in Denver and at the National Marine and Aquatic Educators' National Convention in Maui, HI recently.
• To use my background to help this process and to learn about polar education priorities to guide our own IPY project.
• To contribute to effective education and outreach for IPY, education and outreach that is integrated with the research; education and outreach that reaches a broad audience of all ages;
• I would like to engage with the IPY community, both scientific and educational, to facilitate the use of IPY data by teachers and students. I think that this workshop will provide a venue where I can offer the tools and expertise I have and begin to collaborate with others to learn about their resources and brainstorm how to best to combine and enhance each other's efforts.
• To be sure we reach K12 students and young people as they represent the future. Also interested in how this theme will develop, and general interest in global climate change connections with the Polar regions.
• To be aware of EGC actions internationally and try to link them to Swedish participation.
• I would like to ensure that we are aware of similar IPY activities that we can learn from or collaborate on, and IPY activities that we can link to. Schools on Board is included in a larger IPY proposal, that if funded, would include an International Student Field Program and a Circumpolar Inuit Student Field Program on board the CGGS Amundsen during the proposed Circumpolar Flaw Lead Study. Both proposed field programs could benefit from international collaboration.
• I planning a book series under the IPY umbrella on Environmental research within IPY. This project has a strong linkage to the central topics of this workshop.
• My reason for participating in this workshop is to help identify key science concepts for IPY that should be implemented into the K12 Science Curriculum.
• I am a science Principal Investigator for the GLOBE Program's atmosphere protocols and I have proposed expanding precipitation protocols to make more snow-related measurements.
• I have previously participated in ESE community meetings and have gained a lot of insight into applications of current science for the classroom. In addition, the networking and planning aspects help me to feel more professionally connected to what is going on if I do when I just see a flyer or email announcement.
• We are presenting 2 PESFY documentaries, a web site, a live public science forum and incentives for science cafe events. We mainly want to begin to get the word out about our plans, refine some ideas and coordinate with anything similar. We are applying for NSF funding, but will probably need additional sources, so that is also an area of interest.
• I am interested in more information about how the USA plans to participate in the IPY. I especially want to know how NASA might be involved.
• I am on the staff of COSEE-West, one of the "Centers for Ocean Sciences Education Excellence" funded by NSF. Our mission is to disseminate information about current ocean issues to educators and the lay public, and to help K12 teachers use this information as a teaching tool to engage students in science. Polar ecosystems fit the bill.
• To learn more about polar regions and discover ways to tie it to the curriculum.
• I am very interested in promoting science education as a career choice for students. My goal is to find out as much about field experiences in polar regions as possible to be able to how scientists work. Science needs to come alive for students in order for it to catch their attention and become their passion. Also, many people don't have many ideas of the impact of our polar regions on the well-being of the Earth.
• There is much progress to be made in communicating the nature of science and scientific results to K-12 teachers and students.
• Desire to know and understand community of researchers and educators working in these regions.
• Need my energy to the united effort of IPY.
• Identify teaching resources and opportunities to strengthen my program in Tierra del Fuego.
• Building collaborative partnerships.
• Learning new approaches/technologies for public outreach.
• Sending a message to the scientists and educators that the Arctic is home to indigenous peoples who need to be involved in IPY.
• To gain more knowledge and be able to pass that on to my students. I love learning new things.
• It has been exciting to bring awareness of the Arctic to students in Toronto, Ontario. I am working with an Independent Learning School to develop a course called Arctic Quest. Through this, we hope to encourage young people to travel to the Arctic, meet Inuit people and make career choices that include the Arctic. I would like to help Inuit students and artists as well, and also share some of our education initiatives with students across the country. As a group of artists, Arctic Quest is very interested in working with artists from circumpolar countries as well as organizing international art exhibitions.
• To help make connections between the scientific/research world and the elementary school science classroom.
• To learn more about a subject matter I am trying to get my students to understand better.
• A belief that the Polar regions are the places where change environmental change is first seen, and potentially the most devastating to the ecology of the region.
• Current resources for changes to polar environment

WHAT DO YOU HOPE THE EARTH SCIENCE EDUCATION AND THE IPY COMMUNITIES ACHIEVE AS A RESULT OF THIS WORKSHOP?

What do you hope the Earth science education and the IPY communities achieve as a result of this workshop?

• IPY has the opportunity to raise the public’s awareness about global environmental issues. It is important to educate tomorrow’s voters about the issues our planet is facing.
• I hope that the end result will be to have some concrete ideas and ways to disseminate information to other educators to get them excited about the IPY.
• Some impact on the general populace in terms of improved understanding of the polar regions and the various ways they inform us about the Earth. Also, a greater impact on policy makers and decision makers along the same lines.
• That the world population will understand how the planet’s climate is changing, their role in the process, and help society understand how it needs to operate to balance the earth’s system.
• Concrete plans to incorporate education and outreach as a core part of IPY.
• I hope they help to foster collaborations and to generate excitement for IPY.
• Better understanding of each other and possible synergies.
• I hope for greater communication and sharing of content between the communities, and a wider recognition of polar processes among the Earth system science community.
• Increased focus on informal ed to the general public – lay audience – and K-12.
• More information accessible to students.
• I want people, outside the fields of Polar science, to be blown away by the complexity of Polar biomes and to formulate their own opinions regarding how susceptible those regions are to imminent change.
• What is the relation of the melting of the Arctic and Antarctic to sea levels world-wide. How does the retreat of the glaciers affect the Great Lakes, wetlands and water supply?
• Focus attention on key areas of opportunity and need and gain some new ideas for polar education and outreach.
• Increased collaboration among researchers and educators. Recognition by researchers that education, outreach and communication are important. Improved communication with Arctic residents.
• I hope that Earth science educators and the IPY communities come to a shared vision of what IPY can offer Earth science education and the potential mechanisms by which IPY data and knowledge can be made available to that community.
• A better understanding of our impact on the environment, especially marine and polar regions which may be heavily impacted due to climate change (and therefore impact us even more).
• A lot. This can only be a win-win situation!
• Identify the key messages so that we can have a unified approach to communicating IPY objectives to the public - i.e. broadcasting school, educators or the public with an overwhelming number of messages. Make people feel like they are part of something “BIG” - make IPY attractive for audiences to buy into the message.
• Improve communication linkage and educational potential with IPY.
• I hope we form one collaborative group working together to achieve the goal of IPY.
• A chance to engage GLOBE students and teachers in snow-related activities that broaden their understanding of how snow-covered surfaces impact climate.
• I would like to see parallels between Mars and Earth Polar exploration, and I would like to see the development of usable inquiry activities on the topic for 9-12 and early college students.
• See above.
• Improve communication so that information can be shared and cooperation among investigators can be established.
• The emailed announcement says it – ”...identify important messages and concepts to communicate to various audiences during IPY and determine effective strategies to accomplish this communication.”
• Learn if there are any long term effects to region as result of global warming. Learn if polar region is in danger. Learn if organisms in region are thriving.
• I hope teachers and students will become better aware of how the entire Earth is impacted by our Polar regions.
• The Arctic and Antarctic inspire the imagination and capture people’s enthusiasm. The overall goal should be to share the excitement and sneak in some science concepts to create a better informed public and education system.
• an integrated approach to using GLOBE as a vehicle for reaching IPY goals.
• Unified and coordinated effort to expand the Polar Learning Community
• Ideas to improve teaching and communication of Antarctica.
• Better collaboration?
• Furthering knowledge of this subject.
• I hope they bring awareness of the importance and fragile beauty of the Arctic to others, inspire students to go into careers related to the Arctic, and give Inuit communities a sense of pride and hope. I hope the world sees it as a global responsibility to preserve the Arctic.
• I hope some type of curriculum or ideas for teaching about the polar regions to elementary school students is developed.
• A better understanding of the intricacies between the polar regions and the rest of the world and how this is related to the Earth sciences.
• Making Inuit and other people aware of the need for continued research in the polar regions and the importance of making lawmakers aware of their understanding.
• Materials for classroom teachers for current resources for changes to polar environment.

WHAT DO YOU HOPE TO ACHIEVE FROM THIS WORKSHOP FOR YOURSELF?

What do you hope to achieve from this workshop for yourself?

• I hope to find ways to make a substantial contribution to the IPY.
• I hope to leave with the enthusiasm that networking with other “polarized” educators can bring and get ideas for myself in the classroom.
• Ideas from interactions with others.
• That I was able to do as much as I could to improve how we live with the earth’s system. The coming decade is a crucial time in how we live and balance the system. What we do now will set up the extent and severity of the changes in the earth’s climate system.
• Keep abreast of what’s happening “out there.”
• I hope to learn how to better focus my proposals and to learn if there are other funding sources that will help with international programs.
• Learn more about the different projects.
• I hope to make new contacts and partnerships that can help link ESS and polar processes in the undergraduate classroom.
• Tools and information to increase collaboration and spark new ideas for events and education about the changing Arctic.
• To gain a broader knowledge of potential research topics planned for the IPY.
• I want to learn about what people think are the main issues that need to be addressed regarding Polar Sciences.
• I hope to be able to first learn, then understand their global implications, and later interpret the above events accurately and spread the word.
• Meet more people involved in polar education and outreach community. Find possible collaborators.
• To meet other educators and outreach specialists. To hear more about their education and outreach ideas and plans. To increase my participation in IPY education and outreach.
• I hope to identify new partners, both within the US and internationally, which will contribute to bringing IPY into the discussions in schools and students and in informal contexts.
• A better understanding of Polar regions and how to communicate that information to K12 environment.
• Broader networking and possibilities to attend into different new work groups.
• Learning what other agencies and groups have planned re: communication, outreach and education - getting connected with related agencies and groups who share similar goals - experience the virtual workshop process - exposure to new ideas.
• Learn more about communication tools for education and knowledge transfer.
• I hope to gain a lot of knowledge about our polar regions.
• Access to potential funding opportunities.
• Lesson ideas, and contacts within the polar science community.
• See above.
• I am personally interested in the study of the earth as a whole, and recognize the importance of the polar regions as a unique laboratory for such studies. I want to know what is planned.
• I hope it will give me a better understanding of how to communicate environmental issues, improving my own skills.
• Knowledge about region and organisms that live there.
• I hope to be able to have information to share with my students and with other teachers in our district and beyond.
• Increased understanding of how to communicate my research to a general audience, feedback on what people find captivating, what issues they are concerned about.
• Improve my knowledge.
• Add my energy to a project that will be effective in achieving the above.
• Identify teaching resources and opportunities to strengthen my program in Tierra del Fuego.
• In addition to positive outcomes of what is described in the "reasons," I would not mind to have leads to concrete project activities.
• More information that I can share with my students and staff. Learn of opportunities for students to research about IPY and any possible interactive websites they can use.
• Opportunities to pull cross-curriculum educational resources together further enriching the art workshops that I teach and developing educational initiatives between the North and the South.
• I hope to learn more about the polar regions and the research that is being conducted there. I would like to be able to share this information with my colleagues in Fowler Elementary School District.
• A connection to the international community regarding the educational practices involved with the polar regions.
• Offer ideas, gain knowledge of programs, and learn how to "spread the word".
• Greater understanding of dynamics of the polar ecosystem.

WHAT DO YOU HOPE TO ACHIEVE FROM THIS WORKSHOP FOR YOUR ORGANIZATION?

What do you hope to achieve from this workshop for your organization?

• I hope to find better ways to engage students in polar learning and also develop ways to motivate teachers to integrate polar science into their curriculum.
• I hope to be able to share ways we can actually contribute to the IPY through some types of activities that can be done globally as well as in the polar regions. In addition, I hope to gather more information to share with other educators here.
• A greater role in polar research.
• That NOAA and the general IPY education community will substantially improve the climate literacy level of the public and that climate science products and services will inform societies knowledge and decision making as a result of the IPY.
• Keep abreast of what’s happening “out there” and help those “out there” know who we are and how we can help.
• I would like to increase the awareness of IPY for my organization.
• Funding and/or partnerships.
• I hope to achieve greater visibility for USRA in the international education arena, specifically in IPY related topics.
• ctbd
• Not sure. I think that most people in my organization are well aware of Polar issues. I do think that people at institutes like me don’t have the time to do adequate outreach... but maybe this will empor enthusiasm.
• I hope to be able to teach my high school students the about the reality of our water cycle. How important are the Arctic and Antarctic and the melting of all those glaciers to us here on Lake Michigan in the Midwest.
• Integrate better the polar scientific community with informal education efforts.
• That it becomes an integral part of IPY education and outreach in partnership with other organizations and individuals.
• I hope to develop new collaborations for my organization.
• That our organization is supporting and contributing to efforts that may help us understand our environment better and to assist in communicating that understanding to the general population.
• Greater knowledge and participation - both on a international perspective but also at home ground. Creation of joint projects.
- Look for linkages with other people who can contribute or complement our program exposure of the ArcticNet outreach initiatives that are being planned for IPY.
- Develop a broad network on communication and high level University education for a close IPY co-operation also beyond the IPY time frame.
- In the end, I hope the HCRSSI will incorporate the science concepts from IPY into K12 Curriculum.
- N/A
- Bring polar science into the classroom, and also
- See above.
- I want to know what is going to occur in case the group I work with will contribute (NASA Langley Research Center Solar Applications Group).
- New concepts and communication tools related to environmental issues and ocean interact
- New ways to teach science concepts related to polar region.
- Same
- "There's no such thing as bad publicity". We are not known for Polar research, but we do a lot of it. This is a chance to advertise that fact.
- A stronger proposal for IPY
- Greater connection to polar science for our students
- Identify teaching resources and opportunities to strengthen my program in Tierra del Fuego.
- The same as above
- Information to share with my staff so that they will be better equipped to share it with their students.
- Work together with artists in circumpolar countries and arrange exhibitions in these circumpolar countries throughout IPY—perhaps plan voyage with artists from circumpolar countries to Arctic or Antarctica.
- I hope to gain updated information I have with my colleagues on the polar regions and the research that is occurring today.
- Support for broadening new millennia educational practices for teaching our children.
- Include IPY in NYS science curriculum.
- Resources for our science department.

SOURCE OF INFORMATION ABOUT POLAR SCIENCES

How do you currently gather general information about polar science topics (check all that apply)?

- Online resources
- Conversations with colleagues
- Professional conferences
- Newspapers
- Professional journals
- Email lists
- Television, Radio
- Popular magazines
- Books
- Fieldwork experiences
- International fora, such as Arctic Council
- Rely on partner organizations and teams
- TEA archived information
- Workshops like this
- Other

* Note: Multiple answer percentage-count totals not meaningful.
POLAR CONCEPTS TO BE CONVEYED

Please describe three to five basic concepts that should be conveyed about the polar regions (i.e., that a "polar literate" person should understand).

- Comparing Arctic and Antarctic: ice over ocean vs. ice on continent; polar bears and penguins; thickness of ice; indigenous populations/scientists and support people only, and so on.
- Evidence of global warming at the Poles and the consequences of the changes.
- Poles as indicators for the planet.
  - Role of the cold oceans--food chain; weather, ocean circulation; etc.
  - 1) Why we should care about remote places that seem so far removed from everyone else.
  - 2) How can we improve the “real” earth and how we are all connected.
  - 3) Lessons we can learn from the international collaboration model that was brought about by the IGY in the middle of the cold war. Even during wars, Antarctica has been the site of cooperation. It truly is an amazing model.
  - 4) Environmental implications—think it is imperative that people understand global warming and ozone depletion.
  - 5) Conservation and Limited Resources--think this model is important as it affects everyone, and our society can be so "throw away". More awareness for the need of: water conservation, recycling, alternative energy sources, we only get one planet.
- The poles encompass vital feedbacks on the stability of the Earth’s climate, and as such help control our climate. The poles are our “canary in the coal mine” for future climate change. What they experience now, we will later.
- Sea levels are the greatest economic threat we face in the coming one to two centuries. How does Greenland and Antarctica, so goes sea level.
- The poles show us our past, through ice cores, in more detail than any other record of the past.
- Global connection of the earth’s poles to the earth’s system and the rest of the planet to the poles.
- Positive feedback systems role in the earth system like polar amplification and its consequences.
- What is the difference between climate variability and climate change.
- How changes in the cryosphere impact the planet.
- The story told by traditional knowledge of the Arctic.
- International cooperation/Interdisciplinary research/Pristine/rich ecosystems.
- 1. Polar regions are not some “distant, unimportant” part of the earth system but rather an integral, connected and important component.

2. There is much to be learned from polar research of real relevance to society.

3. International science collaboration like IGY is valuable in many ways.
- 1. The polar regions connect to us and affect us.
- 2. The polar regions have unique ecosystems.
- 3. The poles serve as indicators of the planet’s health.
- 4. People live in the Arctic.
- 5. The polar regions are not dark, frozen places all year around.
- 6. The Arctic and Antarctic are different places.
- The Internet of Things (IoT) and mobile devices.
- The polar regions play an important role in Earth’s energy balance. Polar regions are sensitive early indicators of climate change. The poles are an important part of the Earth system overall.
- (1) That while there might be ongoing dialogue and debate about the rate, nature, causes, and effects of the changing Arctic, the Arctic is changing now.
- (2) These changes will have real local and global effects.
- (3) Native residents are eyewitnesses to these changes, and can bring a new perspective to scientific research.
- Climate change studies potential/international cooperation/resources: exploitation and conservation/history of exploitation/international connectedness.
- We are in an abrupt climate change as we speak.
- First world nations have the capacity to deal with change far better than third
Polar regions are a treasure trove of life and landscapes
Communities in polar regions are deeply affected by climate change
- All water behavior is related. There is a unified water cycle.
- All life began on the earth in the hydrothermal deep in the oceans.
- The polar regions change over time.
- Glaciers and their behavior can affect the coastlines in the lower latitudes.
- It is the place where glaciers melt and expose silt or water is incredible.
- 1. There's more to the eye in the kernels than polar bears and penguins.
- 2. Research on environmental and climate changes in the polar regions are key to understanding global climate.
- 3. Polar regions are an exciting and interesting laboratory for scientists of nearly all disciplines to work, where key discoveries are being made that affect everyone on earth.
- 1. The polar regions are not desolate wastelands isolated from each other or from the rest of the world.
- 2. The polar regions are an integral part of the global environmental system.
- 3. The polar regions affect the rest of the world, and are in turn affected by the rest of the world.
- 4. The polar regions are changing, and these changes will affect the land, oceans, atmosphere, people, plants, and animals in the Arctic, Antarctic, and the rest of the world.
- 5. The Arctic and Antarctic are different from each other in many ways, yet they are also many similarities.
- 1. The polar regions are unique in the Earth system
- 1. Their position with respect to the sun and the implications that that for the yearly cycle of incoming solar radiation (energy) are in sharp contrast to what is experienced in the rest of the world.
- 2. The polar regions are more sensitive to factors that influence global climate than other large regions on the Earth and may therefore signal future large scale global changes.
- 3. Wide spread ice in the polar regions has a large influence on the surface energy balance because of both its reflective and insulating properties. In particular, it can have an astonishing large impact on the energy balance.
- 1) What happens in the polar regions is not isolated and may affect the entire globe as well as our climate.
- 2) Our human activities that contribute to global warming also directly impact the polar regions.
- 3) Simply an appreciation of the vastness and "wildness" of these regions and how important it is to keep them that way.
- 1. Thermohaline circulation and the great ocean conveyor
- 1. Role of Sea Ice
- 1. Connections between the poles and the rest of the planet; climate
- 1. Life at both poles
- 1. Arctic People - Past and present - culture and their observations of change in the Arctic
- 1. Low temperature environment, snow as major deposition medium, Polar night, midnight sun,
- 1. The Earth has two polar regions each with unique features. The polar regions support a great diversity of life and ecosystems. The connections between polar science and everyday life
- 1. Polar areas have a significant and poorly understood effect on Earth's climate.
- 2. Activities that increase the transport of particulates in the atmosphere, especially soot from biomass / fossil fuel burning can alter the energy balance over snow-covered surfaces.
- 3. Issues of interest in polar regions can also be studied in any non-polar regions where snow occurs.
- 1. Ice is more than just water. Ice moves and is not static.
- 3. Polar radiation levels are higher due to the magnetosphere.
- 4. South Pole regions are prime locations for meteor studies.
- 1) They are vulnerable to change. 2) Change has implications for local animal and human inhabitants. 3) Change has implications for us all, through the global climate and sea level.
- 1. Unique environmental conditions exist at the poles allowing observations of the atmosphere and space can not be made elsewhere.
- Changes to the earth's climate will be apparent at the poles sooner than elsewhere on earth, making it a "canary in the mine" for the rest of the planet.
- These fragile ecosystems deserve to be protected and preserved.
- 1) Although physically distant, the polar regions affect everyone's lives through their impact on climate, currents, etc.
- 2) Polar regions are key canaries in mines - sensitivity to climate change.
- 3) Arctic and Antarctic regions are similar in some respects, but very different in others.
- I'm hoping to learn about region.
- 1. The impact on global climate and global climate change.
- 2. Examples of the types of science research that are occurring in polar regions, and the people or institutions conducting the research.

xxii
3. Marine mammals in the Arctic.
4. Permafrost, what it is, how it's changing, how changes affect the rest of the world.
5. The people of the Arctic, how they are, what they do, how their lives are the same and different from those of preceding generations.

My focus is on the Arctic. The most basic concept is that the Arctic is an ice-covered ocean. The next level is to realize that the seeming permanence of the ice cover is an illusion. Ice is constantly being created, destroyed, and moved around. Finally, there appear to be significant changes in store, the most dramatic being an ice-free Arctic. What are the implications for climate, commerce, native societies?

- the uniqueness of the resource, the relationship between the ways we choose to live and its impact on the polar regions, the vastness of the polar regions - yet unexplored.
- the effects of global warming are accelerated at the pole: the surface area of ice at the pole is important in reflecting the sun energy; therefore fragile environments need to be monitored and conserved.
- The role of the poles in the Earth system, particularly climate.
- The richness of life in polar seas.
- The economic potential of the poles.
- The international agreements that govern Antarctica.
- The poles are symbols of international cooperation for research and conservation.

- Arctic is a barometer of world climate changes in the Arctic will resonate in other parts of the world.
- The Arctic and sub-Arctic, unlike Antarctica, are places of permanent residence of millions of people; research and environmental protection should be balanced with opportunities for economic development.

1. Definition of a polar region - how is this different from others. What distinguishes it?
2. Any life forms and how they exist.
3. Science explorations that are currently being done in this area. How do we track research results or possibly interact with the scientists and ask them questions about their research?
4. What is the effect of global warming on the polar regions?
5. What role do the polar regions play in Earth?
6. How do the poles affect the other regions of the world?

Young people are at risk of losing their heritage (language and culture)
- Climate change affects all life (the entire world)
- Young people are at risk of losing their heritage (language and culture)

- Geology, basic knowledge, ocean-land-ice interaction, role in the earth's system, teleconnections between poles and the earth, basically there are more misconceptions than correct information. Perhaps the biggest misconception is the lack of knowledge of the extent of the misconceptions. It must be great, but to what extent in what sector and region of the United States is just unknown.

- There is nothing there. Polar bears and penguins live together. What happens that far away couldn't possibly be important or relevant to my life.
- The polar regions are not dark, frozen places all year around.
- No one lives there year around.
- There is only one season in the polar areas.
- It doesn't matter to me as it is so far away.

Most Common Misconceptions About the Poles

What have you found are the most common misconceptions about the poles?

- Polar bears and penguins live in the same areas. Ozone hole is the cause of global warming.
- I think most people don't realize what we can actually learn from the poles and they certainly don't realize the amount of science (other than studying penguins) that goes on down there. Many people get the two confused. "How long did you work up there?" is a question I often get when someone finds out I worked in Antarctica.
- That they have no life. They are distant and disconnected from the rest of the planet.
- Geology, basic knowledge, ocean-land-ice interaction, role in the earth's system, teleconnections between poles and the earth, basically there are more misconceptions than correct information. Perhaps the biggest misconception is the lack of knowledge of the extent of the misconceptions. It must be great, but to what extent in what sector and region of the United States is just unknown.
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- There is only one season in the polar areas.
- It doesn't matter to me as it is so far away.

Often confused with Polish people (-;
I have not personally observed misconceptions, but perceive a general lack of thought about the poles in
general, that their remoteness implies less importance on the system overall.

These are misconceptions about the "polar regions" not the poles themselves: that penguins live in the arctic;
that all of the arctic is frozen year-round and never green; that antarctica is very small because of how it
appears or doesn't appear on the map; that nothing much lives in the polar regions; that the polar regions
don't matter to the rest of the world; that the arctic ice sheet has changed significantly over deep time; that
parts of the United States, Canada, Russia, and Europe are part of the arctic (they think of the poles as just
that - two remote poles); people don't understand that at the arctic pole you find ice over water but at the
Antarctic pole you find ice over frozen land.

There is no life in polar regions.
First, very few have ever been a glacier. The only ice they know is if they live in a colder climate. Our inner
city urban children do not visit neighborhoods beyond 7 blocks. They may think there is no connection
between what is going on in the poles and their own lives.
That they are unimportant to the rest of the globe.
That nothing much happens there beyond rescuing doctors from the south pole or fighting about oil drilling.
1. They are absolute wastelands isolated from the rest of the World.
2. Confusion over which one is where.
3. They can be ignored.
4. Penguins and polar bears - which lives where?
5. It risks me when I see the sea ice cover of the Arctic Ocean described as an ice sheet. An ice sheet is a
   glacial feature.
Many people seem to not have a clear understanding of what "six months of sunlight and six months of
darkness" really means in terms of its impact on temperature, plant and animal life, and the environment.

I would also think that people who live in consistently warm regions where climate conditions change very little
over the course of the year do not have good grasp of what the extremes in the polar regions are really like.

Simple misconceptions about wildlife (what actually lives where) The Poles are static and lifeless and
unimportant.
Where they are - and how vast they are. Also the lack of knowledge of everyday life that is going on together
with the very intense, but also difficult, fiestas that takes place.

Effect of melting ice on rising sea levels - in the Arctic vs Antarctic life. on each pole - the poles are
pristine, clean environments - temperatures are similar at both poles
Polar regions are isolated from all human activities and, thus, completely pristine environments. Indigenous
people of the Arctic have no knowledge about the environments they are calling their home.
I believe there is a general lack of knowledge and understanding about the poles. Students leave elementary
school only knowing that one pole is a continent and the other isn't and one pole has penguins and the other
polar bears
I would suggest (without actually ever having asked) that a common misconception is that polar regions are
not important to global climate because they are far from the production sources of greenhouse gases and
particulates;
That nothing lives there
People see them as static places where there are penguins and polar bears. Change and vulnerability are not
thought of.
Polar bears and penguins co-exist.
That they are too far away to be important to people not living in polar regions. That polar bears are in the
Antarctic
That it is always freezing cold in the arctic. There aren't plants and for animals mostly polar bears or penguins,
depending on which pole you're at.
The extent to which the ice cover, although "permanent", is part of a dynamic system, very different from a
fixed sheet of ice that sits on a small lake all winter.
The size of these regions, the enormity of the ocean resources, and our relationship to the health of the seas
polar bears and penguins are at both there are plants and people living in Antarctica, the same as the Arctic
That they are barren territories with no particularly important role in human development.
A habitat of penguins and polar bears
That everyone lives in igloos. That there is snow year-round. That plants don't grow there. That the snow and ice
never melts. That the weather at the poles doesn't affect people who don't live there.
Students don't understand that Antarctica is a dry place. The frozen ice caps causes them to think that it is
humid there.
From my students perspective, it snows a lot at the poles.
What wild life if where. How 24 hours of daylight work. How research is done at the poles. Living conditions at
the poles.
CONNECTIONS BETWEEN POLAR SCIENCE AND EVERYDAY LIFE TO BE HIGHLIGHTED

What are the key connections between polar science and everyday life that should be highlighted in education and communication efforts?

- Evidence of global warming - how people can make a difference in slowing the process.

  As citizens of the planet, we should all be concerned about the environmental problems faced by the indigenous people of the Arctic - we may be next.

- As stated above, the IOY which lead to the Antarctic Treaty has been an incredible feat! Such global cooperation is truly amazing. Today it is necessary to foster a spirit of cooperation and tolerance for the global society we are rapidly becoming. I also think the environmental issues such as recycling, alternative energy, the poles help shape our planet, from its climate to its atmospheric composition. They are the last frontier, yet they are the first to change. We know more about the bottom of the ocean than the bottom of the Antarctic ice sheet.

- Water cycle, weather prediction improvements, sea-level rise, earth systems science, societies resilience, climate change mitigation, drought, ecosystem stability, nature of science

  - the "wow" factor: these are incredible places, beautiful, that spark the imagination.

  - environmental change is happening in the polar regions, things we can see and measure, and this will tell us much about change in the planet overall

  1. The poles are the driving force for the ocean and thus our weather/climate.

  2. The poles are indicators of the planet's health.

  3. The fisheries in polar waters are a major source of fish for the world and are important economically.

- Internet

  Polar processes impact climate and weather and the Earth system overall (e.g. sea level, carbon reservoirs, ocean productivity etc)

- (1) Polar science is a great example of how exciting and fascinating scientific careers can be. Polar scientists can be great role models to K/12 and even Undergrad students interested in science careers - teaching why science matters, how good science is done, and why it such an exciting time to be a scientist. (2) While the poles seem "remote" and far away - this research can successfully demonstrate the earth's global system dynamics. (3) Important everyday goods and services are affected by changes in the Arctic.

- Human affects on the polar environment Biodiversity in the polar environments.

- We are a global community. There are people just like you and I in places where lakes are drying up or sea ice is breaking up too early. If their life stories need to be heard.

- Do not build your home on the edge of the water. Preserve the wetlands. Help recycle water. Get ready for a warmer climate. What will happen to the crops we raise in certain locations? How will this affect our livelihoods? How will this affect our diets? How will this affect our transportation systems?

- 1. Scientists are human beings engaged in a process that can be recognizable and understandable to the general public.

  2. The stories of polar science are interesting and compelling and reveal how nature works.

  1. The polar regions matter to us all, they are of global significance.

  2. The polar regions function year-round; they don't just come alive in the summer when most scientists do their studies.

  3. Polar science is enjoyable and rewarding, and not just a summertime activity.

  4. You don't have to live in the Arctic or Antarctic to be a polar scientist; your next door neighbour in San Diego, say, might be a polar scientist.

- I think that a comparison of the everyday life of Arctic people and how they have adapted to the polar environment with everyday life in temperate, desert, and tropical regions would be a key connection.

- Our actions affect the environment which includes the polar regions cores can reveal important information on past climate and guide us to better understanding of today's climate change.

- The knowledge from the scientists about for example the Gulf stream (affecting the whole climate of Sweden).

- examples of how the classroom sciences (biology, chemistry, and physics) are being applied in polar research.

  - Highlighting research opportunities for next generation of scientists to consider

  - Connection between the poles and climate change.

- Polar environments as looking glass and early warning sites for global processes incl climate change and greenhouse effects.
Polar regions as the last "untouched" environments representing environment, still almost unaffected by human activities.

- I don't know what this is, hence I've listed it above.
- The key connection is the relationship between polar science and global climate.
- I believe that global warming should be at the forefront of polar issues.
- It's all about climate.
- Changes to the earth's climate will be apparent at the poles sooner than elsewhere on earth, making it a "canary in the mine" for the rest of the planet.
- Climate studies, worldwide climate food web effects of changing its connections pollution studies, worldwide dispersion of pollutants into ocean current conveyor belt.

1. Changes that occur in the amount of ice in the polar regions affect global weather/climate around the globe.
2. Connect native Alaskans to native people in other states.
3. Environmental impact of looking for or getting oil from arctic areas.
4. Ocean currents connect the rest of the world (tides etc) to the polar regions.

- When it comes to climate, it's one world. The poles are just as important as Kansas or the equator. People identify with polar wildlife (penguins, polar bears), they should know about their habitat too.

- The polar regions and the study of life there offer many opportunities for scientists to learn and improve life in all regions of the world.
- Polar exploration and space exploration require similar approaches to sustainable or low impact living
- the poles affect the world's climate
- Climate, natural resources and symbolism.
- An indicator of environmental changes that could be related to well understood impacts (e.g., weather pattern changes)

1. Effect on atmosphere/global warming
2. Climate change in the Arctic affects weather conditions around the world
3. Children should understand why the melting of the ice caps is a concern to some scientist. They need to understand how this can affect their world.
4. What we do in our everyday lives affects more than our local environment. Climate changes worldwide can reduce or remove the delicate balances that will either destroy or preserve the polar regions.

- Ocean current connectivity impacts life in the temperate regions by being the advance warning of environmental change. Thermohaline pumps may be an important factor in climate change. Resolving the Holocene environment is important for understanding the change going on.
- Earth/ocean systems affect areas far away, including polar regions; these are not "waste" areas.

OTHER COMMENTS FOR WORKSHOP ORGANIZERS

What else would you like the organizers of this workshop to know?

- I really think we can make a difference in science education with the IFY if we market it correctly. With the current push on science (Time magazine's Feb 13 cover was disturbing) this is an opportunity. With the interest today in extreme everything, we have the power to hook kids into science just by presenting them with this unknown info.
- Any way you can get a spell checker for these boxes??
- There has been significant international and US-based planning for IFY already. Don't start from scratch. Look at the science themes developed by the ICSU-WMO Joint Planning Committee and the US report "A Vision for International Polar Year" (2004) by the US National Committee for IFY, under the National Academy of Sciences.
- People are fascinated by polar places the same as they are fascinated by Mars and the Moon but they don't see or feel a connection to them. Many people do not know people live there and are being affected now by climate change. They don't see how the poles connect to the tropical islands that they like to visit for vacation. We need to make the human connection (triumphs, tragedies and everyday life).
- That they are wonderful people for organizing the workshop. (-)
- I look forward to this venue ...
- I am not sure.
- Kids in the k-12 vote when they become 18. They must become learned about science, especially an event that is changing the temperature of their climate, causing them to wear lighter clothing. Only 8% of our college students major in science. Because of this the NSF has funded me as a Fellow in 2 institutions of higher
I think it would be very worthwhile to try to connect students and teachers who live in the diverse regions of the Earth with those who live in the poles, just as IPY is working to bring international collaboration to the scientific research efforts.

there is a lot of educating to do about this special region. It might be helpful to convey (to the general public) why this year was chosen, what was the impetus to making this the IPY?

Focus on strengthening communication tools within Polar Sciences and knowledge transfer across the borders of the scientific disciplines.

As you can tell, I do not know much about the Poles. I will try to read some reference material prior to the start of this workshop.

I would like to see more Mars earth connections since the Phoenix is scheduled to land in 2008.

I am very excited you are doing this, and I can't wait to hear more!

Young students seem to be able to relate most to other young students, so peer support networks between the inuit and non-inuit students are important.

Young students are very interested in animals, and if they feel animals are in danger, they may be motivated to help.

I would like to be able to provide some insight to scientist where elementary school students are developmental. I would also like to be able to share that these students are capable of understanding what is going on at the polar regions because of their natural curiosity and love for science.

A website that is clear and concise which has links dedicated to each stakeholder group is important in getting the word out. Linking the IPY to State Science Standards with presentations at State science education conferences should also be a priority.
Survey 2—TCOE Registration Survey Report

Quiz: IPY_ICE_Registration

This page displays all of the problems for this quiz, a graphic summary of the quiz takers' choices, and all text responses to each problem.

1. Primary Role Related to IPY (42 answers)
   Primary role related to IPY - check all that apply:

2. Interest or Expertise: Research (21 answers)
   What are your research areas of interest and expertise? Check all that apply:

3. Outreach/Education Areas of Interest or Expertise  (42 answers)
What are your outreach/education areas of interest or expertise? Check all that apply.

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<td>Online Resource Creation</td>
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<tr>
<td>Not Applicable</td>
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</tbody>
</table>

Other description:
- data management, science/technology policy
- galleries, museums
- museum
- online learning environments
- web-based programs
- writing plain language resources that are culturally appropriate for the north.

4. Audience You Are Focused On  (37 answers)

Audience(s) you are focused on:
- all
- Arctic resident 9-12 & undergrads
- art audiences
- both the general public and the broader scientific community (particularly those NOT involved in polar research)
- children ages 13-17 and general public
- children from K - 12th grade both in informal and formal education settings and their teachers.
- currently, I work with researchers and K-12 educators in my programs
- educators (K-12 and undergraduate) and students, scientists, data providers, tools developers, curriculum developers
- general population
- general public
- global K-12
- grades 9-12
- high school and voting community
- high school students and science teachers, general public
- I write resources for northern educators and audiences that attempt to be culturally appropriate and written in plain language
- in my current role at the North Pacific Research Board audience focus is on the subsistence users, the

general Alaskan public, Commercial Fisheries and Resource Managers.
- K-12
- K-12 audiences and teacher training
- K-12 students and teachers both formal and informal education
- K-12 students, teachers, parents; college students (particularly pre-service teachers); community-at-large
- K-12, undergraduates, graduate students
- K-12 primarily undergraduate and graduate students general public
- K12 teachers, general public
- Middle and high school age students.
- Middle school science-grades 5-8
- mostly undergraduates and up; but, including general public, policy makers, etc.
- My elementary school students.
- non-specialists
- Northern communities
- post-graduates
- regional undergraduate, through the Center for Northern Studies international undergraduate, through the University of the Arctic
- Scientists
- scientists, general public, policy makers
- Software developers
- specialists in my areas of bilingual and bicultural education and international telecollaboration
- students, faculty, general public
- U.S. Defense personnel & contractors
- Undergraduate and graduate students

5. K-12 Teacher: Grades Taught (17 answers)
If you are a U.S. K-12 teacher, what grade levels do you teach? Check all that apply.

![Grade Distribution Chart]

6. Teacher (1 answer)
If you are teacher outside the U.S. please tell us the ages of students you teach?

Ages you teach:
- 15-17

7. Anything Else (5 answers)

Is there anything else you would like the organizers to know?:
- --
- I am a representative on the International Polar Year Ed. and Outreach Committee and would welcome ideas for connecting teachers around the world and getting the word out to educators about IPY.
- I am currently associated with the SOPHIA project in relation to the EXES instrument and the University of TX at Austin
- I'm not a teacher. I used to teach online publishing to advanced art students and professionals though.
- I'm not working on any Arctic projects at the moment, but I've been involved in Arctic science for quite a while - both as a US Navy sponsor of the submarine Science Ice Exercises, SCICEX, and as a data project manager for a prototype data retrieval and display system.

http://coexploration.org/eg/swebsock/0005929/0979876/COEXPLORER/main/quiz_sum...
3/28/2006
Q. #2 are my areas of research interest but not expertise. Just basic interest in that area. With the exception of social science, I do have some expertise in that area.
Survey 3—TCOE Post-Workshop Survey Report

Executive Summary

ICE FINAL MAY 5 2006 UPDATE

Q1: Name

Q2: Title

- coo-manger
- exco
- Director of Interpretation, Education and Volunteer Programs
- Third Grade Teacher
- Education consultant / political activist
- Assistant Professor
- Prof.
- Climate Education and Literacy Coordinator
- G. T. Resource Teacher
- Assistant Director
- MSP Program Coordinator
- Research, Civil Engineer
- Environmental Education Specialist
- Science Teacher and Learning Behavior Specialist
- Science producer - public radio
- Assistant professor
- Senior Scientist
- Mr.
- Middle School Science Teacher
- Owner/Consultant
- program coordinator
- Teacher
- PD Dr.
- Program Coordinator
- earth science teacher
- Science Chairperson
- High School Teacher
- Research Scientist
- Senior Professional Staff
- Associate Professor and Group Leader
- Climate Education and Literacy Coordinator
- Learning Behavior Specialist and Science Teacher
- Postdoctoral Researcher
- Lecturer
- Director
- Professor
Q3: Organization

Organization

- coe
- WEBCONF
- Maryland Zoo in Baltimore
- Fowler Elementary School
- Antarctic Unit
- self / Illinois eighth congressional district democrats
- University of Massachusetts Boston
- Clarkson University
- NOAA/NASA/GLOBE
- Atholton Elementary School
- Regional Math & Science Center
- LDE
- CPRLE
- MD State Dept Education
- Foreman High School, 3235 N. LeClaire Avenue, Chicago, IL 60641
- KCAW
- UNBC
- TERC
- Gates Intermediate School
- University of applied sciences of kiel
- The SABENS Group
- wright center , tufts university
- Gilroy High School
- History of Polar Research Specialist Group
- Schools On Board, University of Manitoba
- sand creek middle school
- Navarro High School, San Antonio ISD
- Heyworth High School
- National Space Science and Technology Center
- Johns Hopkins University Applied Physics Laboratory
- Resilience and Adaptive Management Group, U of Alaska
- NOAA/NASA/GLOBE
- Foreman High School
- Princeton University
- Univ. of New South Wales @ Australian Defence Force Academy
- Arctic Quest
- Clarkson University

Q4: Country

Country
usa ... USA ... US ... USA ... Argentina ... USA ... United States ... USA ... USA ... USA ... USA ... USA ... US ... USA ... USA ... Canada ... USA ... canada ... United States ... Germany ... USA ... usa ... USA ... Germany ... Canada ... usa ... USA ... USA ... USA ... US ... USA ... USA ... USA ... Australia ... Canada ... USA

Q5: Email
Q6: Primary role related to IPY: (check all that apply)

<table>
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<td></td>
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<tr>
<td>Artist</td>
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<td></td>
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<tr>
<td>Chair of Antarctic Sea ice in IPY, project #141</td>
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<td><a href="http://www.ipy.org">www.ipy.org</a></td>
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<tr>
<td>Earth science systems curriculum and space science</td>
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<td>curriculum consultant</td>
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<td>Other</td>
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<tr>
<td>Totals</td>
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</tbody>
</table>

Q7: What are your areas of interest, research, or expertise? (check all that apply) RE: Research ...
Executive Summary

What are your areas of interest, research, or expertise? (check all that apply) RE: Research Topics

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<thead>
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<th>Areas of Interest</th>
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<td>Antarctica</td>
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<tr>
<td>Both-poles and global linkages</td>
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<td>International programs</td>
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<td>Ice processes</td>
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<tr>
<td>Modeling</td>
<td>9</td>
<td>23.1%</td>
<td></td>
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<tr>
<td>Geology</td>
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<tr>
<td>Biology</td>
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<tr>
<td>History of Polar Regions</td>
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<tr>
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<td>Solar-terrestrial physics</td>
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<td>Chemistry</td>
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<tr>
<td>Polar societies</td>
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<td>Totals</td>
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</table>

Q8: What are your areas of interest or expertise? (check all that apply) RE: Outreach/Education Topics

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<th>Areas of Interest</th>
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<th>Percent</th>
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<tr>
<td>Integrating research, education, and communications</td>
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<td>Informal education</td>
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<td>Undergraduate education</td>
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<td>Graduate education</td>
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<td>Media information</td>
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<td>Data dissemination</td>
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<tr>
<td>Communication infrastructure</td>
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<tr>
<td>Encouraging Young Scientists</td>
<td>1</td>
<td>2.6%</td>
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</table>
Q9: What do you consider to be the most important decisions made in the workshop with regard to the...

What do you consider to be the most important decisions made in the workshop with regard to integrated communication and collaboration on IPY education, outreach, and communication (EOC) topics?

- bring people together
- communication among factions
- I can't say there were decisions. I sense the need for a forward action plan, a way to share resources better, and an agreement that we aren't writing the benchmarks for polar literacy. Formal education has spent too much time figuring out what to teach and not improving upon how to teach or just teaching. Informal education has its problems, but we seem to be more realistic about meeting the audience where it is at and relating the educational messages to the guests.
- I think organizing all of the basic concepts, and misconceptions in a list of 10 items was good. Those are the top ten concepts that need to be focused on when education the general public about polar regions. I also liked the concept map that was created that showed the links to the national standards. That definitely will make things easier for me when I talk with my colleagues about polar literacy.
- Basically I consider that including polar concepts into K-12 Education, preparing a good curricula so to involve the students, would really be one of the first points to begin, then the net of outreach and communication it's also move to this wave.
- Concepts were brought forth defining the International Polar Year, partnerships were forged.
- I don't know. It seems hard at the end to know exactly what conclusions were coming out of the conference.
- The need for formal education in the polar sciences and parallel efforts to raise polar literacy at all levels of societies.
- Gratifying connection at the educational level with teachers from many different countries. Probably the most important outcome is the network at all levels that has been established, with contacts between various groups that are not usually in close association such as primary and secondary teachers, scientists, media specialists, university faculty, etc.
- Making it and joining the community that is forming surrounding the IPY.
- This was such a diverse group of collaborators. I believe, working as a group, we have come to some consensus on what the next steps should be.
- I'm not sure that, in the end, there were decisions made that were clear and concise. I think the workshop did raise awareness of the complexity of the task of communicating a multi-faceted initiative to a very diverse audience.
- Not sure
- Topics and integration with National Standards
- Concepts could be expanded. The role of biology could be clearer.
- I think I might have missed the decisions part. I found the workshop helpful in terms of sharing information, but it was hard to link up with other media types. We are interested in broadcasting our program around the Arctic (and the Antarctic) and I was hoping to find other people from other country's who might be interested in linking up
- The list of IPY misconceptions to dispel - very useful framework and list of 10 items to address.
- 1. How best to make the data and scientific knowledge gained through IPY more accessible to the educational community?
- 2. How best to create working bridges between the scientists and educators, students, and the public
- The forum was wonderful for me to make contact with other artists and educators using new media to expanding our understanding/appreciation of the polar regions
- To create a simple on-line activity that would be made available to students worldwide from "pole to pole."
- In my opinion most important were all points regarding the communication between the different programs and nations.
- Furthermore ongoing collaboration could help in funding and in creating a really wide media coverage for the ipy...
- I believe that over the course of the two weeks a huge spread of institutionalized forms of focus on polar study was uncovered. Many "players" expressed more than just their identity and became to voice their aspirations. This piece is critical to successful future collaboration. The most important decision was less of a statement and more of an experienced realization that collaboration between the past and the future can be supported by new forms of technology.
the form of the blend to serve everyone is a challenge, but by working with the emerging communication element over the two weeks shapes began to form. The decision therefore would be to continue using the tool.

- Not sure there were too many "decisions" made. Some good lists of topics, etc but
- had no time to follow the workshop closely.
- trying to generate the basic concepts and messages that we can all rally around during IPY; addressing some of the challenges
- The wide range of participants led to such a mixture of viewpoints that all of the discussions were extremely interesting. However, it must be mentioned that everyone appeared to express an underlying concern over global warming and what is happening to our polar regions.
- I like this idea to present at NSTA
- a format for linking content of topics to teacher needs and teaching requirements
- No decisions were made.
- The misconceptions work was exceptional. This really framed our future work in some crucial ways. I hope we continue to develop this work that the ICE workshop started.
- The global features
- Within the areas I was most involved, it didn't seem any 'decisions' were made.
- I think that taking students to the arctic is a great way to bring awareness to them of the needs, develop friendships, and lead to potential careers in that area.
- It was a resounding "more opportunities of exposure to polar sciences will make the public awareness improve".
- can't really think of any...

Q10: What IPY events new to you did you learn about at this workshop?

What IPY events new to you did you learn about at this workshop?

- too many to list
- length of it really
- I learned about many different programs that are going on national and international.
- None.
- There was a plethora that was astounding. This venue provided an opportunity to flush this out and hopefully to organize into a concept map for various venues outreach.
- Students on ice and mainly I met people.
- Education and Outreach efforts that span K-12 to PostDoctoral Research. Surprising number of direct and indirect opportunities for students, special museum exhibits and events, field trips.
- IPY Interagency Education Working Group
- The entire IPY timeline was new to me.
- I did not learn about any specific events from this workshop.
- None yet
- The emphasis on polar topics
- The IOC and SCAR
- The Students on ice Arctic tours, and the possibility of a meeting for young (early-career) scientists involved in IPY projects.
- nearly all events which are not organized by a german institution...
- Too many to outline here. I did learn that the parameters of categories have been strict and seem to soften.
- Some new outreach activities being sponsored
- had no time to follow the workshop closely.
- access to new contacts in the field and just learning about what people are already doing and planning for IPY was very useful.
- I did not realize that there were opportunities for educators to visit the poles.
- all of them
- None.
- Many...Everytime we begin to talk/share I learn of a new group of people working on IPY is some very interesting ways.
- Tasmania Convention this summer in Hobart
Executive Summary

- Passport to Knowledge and numerous others
- I learned about the Students on Ice program, and the Students on Board program, as well as a University hoping to get an art exhibition together of circumpolar artists.
- most of the events on the calendar were new to me

Q11: What funding opportunities for IPY work did you discover at the workshop that you intend to...

What funding opportunities for IPY work did you discover at the workshop that you intend to pursue?

- a lot
- quite a few
- This session had little participation, so nothing new.
- Since I teach elementary school I really didn't see any funding opportunities.
- None.
- This doesn't apply to me.
- None, this wasn't as helpful as I had hoped it would be...
- I knew of the NSF announcement of opportunity for IPY education prior to the workshop, but our ideas for proposals have undergone significant modification by the workshop contacts. One example of this is the need for on-line, as opposed to face-to-face, courses in polar sciences for the professional development of teachers.
- NSF IPY, NASA IPY
- Nothing at this time.
- I did not discover any funding opportunities yet relevant to education and outreach, but I will continue to monitor the funding forum should it remain open.
- None yet except NSF
- ?
- None.
- -
- I intend to build between organizations to assist by adding media sessions that support collaboration.
- none
- had no time to follow the workshop closely.
- None
- none
- no new ones
- See above.
- Really none. That is primarily due to limited monies that the US have made available.
- ?
- nothing new
- I'll have to look back at the notes for that...
- none

Q12: What collaboration and partnership opportunities for IPY work did you discover at the worksh...
Executive Summary

What collaboration and partnership opportunities for IPY work did you discover at the workshop that you intend to pursue?

- a great deal thanks
- an excellent array
- I think that I need to kick start the zoo community some how to step into the fray. There is not enough representation of the informal education community here, which really is where the IPY goals of reaching the general public (along with media and film products) is where we are going to reach the masses.
- I learned about GLOBE and Windows to the World. I am looking forward to participating in Dr. Juanita Urban-Rich's program.
- A lot.
- The international youth initiatives; the native art project, the different media initiatives, curriculum development
- I met a number of teachers that I plan to try to work with for expanding Windows Around the World. I met some CA that I may be able to work with to help their work or to expand my program.
- Will partner with other university faculty in the development of courses for professional development of K-12 teachers in the polar sciences.
- Too many to describe here.
- Working with the Elementary TOG
- None at this point; although I would be willing to continue to communicate with those interested in K-12 education and outreach
- Nothing yet
- Integration of polar standards into state science, environmental, and social studies standards; review and make available to K-12 teachers the resources provided as links
- IOC and SCAR
- I learned that it would be a good idea to link with tourism groups because they bring in a lot of people to the Arctic
- Getting involved in Students on Ice and in this young scientist's workshop
- I hope to get to know those who participated in the Data Communications breakout better and possibly collaborate with them in the future. I also learned about some resources that might be relevant to the work of making data more accessible to the educational community.
- Jane Marching
- I definitely want to be a part of the Sun Watch activity generated in the Grade 5-8 discussion. I also will be participating in writing a proposal for NSTA in 2007
- I think there would be several opportunities in partnerships and collaboration in implementing the online portal and the online open source footage archive...
- see above
- further communications with individuals
- had no time to follow the workshop closely.
- I plan to make contacts with other Canadians who are working providing field experiences for high school students and teachers to experience Arctic climate change research. Plan to pursue contact with a new contact from Ontario who is involved in integrating Art and Science. If our proposal is successful, I will need contacts in the 'circumpolar' and 'international' communities - the contact list of this forum will be a useful resource to me.
- I plan to seek an opportunity to visit either the Arctic or Antarctica but I would really like to explore a workshop that provides more of emphasis on astronomy and/or geology.
- partnerships for the Icy Bay program development in Antarctica and the Arctic (and some other venues as well)
- Collaboration (?) with CDIUS and UAF proposed U.S. Education Coordination and Communication Office
- Some collaboration and partnership opportunities I will follow up on in the coming months. NOAA's Climate Education Outreach team will be working with other parts of NOAA's education community along with other agencies and organizations to develop a comprehensive approach to IPY education and outreach. We hope to collaborate and partner with as many groups and efforts as is possible to make a real and measurable improvement to "polar literacy" as part of the overarching environmental literacy.
- ???
- Collaboration with Passport to Knowledge
- I have made contact with Students on Ice, and also with the University of Alaska re circumpolar exhibitions
- K-12 teachers met Andrew Sajor online and am in the process of inviting him to campus.
- a few interested people...
### Q13: Among the following list of workshop resources, which do you plan to use regularly after the...

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<td>Teacher-related references (e.g., lesson plans, standards)</td>
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<td>Theme/misconception discussions</td>
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<td></td>
</tr>
<tr>
<td>Collaboration opportunities</td>
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<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Contacts for participants</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Hearing people talk</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>I will use everything</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>I would hope that a contact list of participants will be generated and distributed</td>
<td>1</td>
<td>2.6%</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
<td>5.1%</td>
<td></td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
<td>n/a</td>
<td>100</td>
</tr>
</tbody>
</table>

### Q14: Please identify the specific resources or information that you found most helpful.

Please identify the specific resources or information that you found most helpful.

- people's stories
- the interaction among all
- I love the lesson plans that are provided by National Geographics. A couple of the photo libraries are going to be extremely useful in presenting information about the poles to my students that live in the desert.
- Links to websites of Education, and topics of communication and outreach
- Hipbone game (although I did not take a seat this time). Lectures and presentations except Ice Science and Satellites a Natural Partnership. Needed to see what Frank Casey was pointing to on the screen as he spoke. Experienced and knowledgeable participants asked questions that helped me see things I didn't even know I was missing which clarified my thinking, sustaining and deepening my interest, curiosity, and knowledge.
- The people.
- Links to websites, and the CoE Online Polar lectures were mos helpful.
- misconceptions discussions
- The two resources I found most helpful were the Teacher-related references and the CoE Online Polar Lectures. I had participated in the Online Workshop, but reviewing the lectures again was a great help.
- I appreciated being able to download the text of the various polar lectures in the Resource Section and read them when I had time. One of my goals in participating in this workshop was to learn more about polar science in general and increase my own background knowledge in terms of the science and issues surrounding the poles.
- The hipbone activities and discussions what a great way to set up and view connections.
- Web sites
- IPY plans, K-Graduate school exchange
- Info from other participants about what they are doing to get young scientists involved and to communicate their research to the 'general public'.
- Meeting other artists/communicators
- I looked through a lot of webpages and links but of course most helpful were the contacts to the workshop members themselves
- Human contacts! The open approach to outreach by those attending was remarkable.
- Listening to everyone talk
- Links to websites
- Concept maps were them down somewhere - can't remember the specific links or lesson plans.
- Links to websites and information about programs
- Networking with the participants
- Informal survey of status quo of perceptions among E/O community.
- Theme/misconception discussions!
- Information about programs and web sites
- Videos/Links/Format of workshop itself
- I found being able to talk to people of similar interests around the world helpful and to see what programs are available elsewhere.
- GLOBE, NASA and National Geographic teaching materials.

Q15: Which breakout rooms would you participate in if this online space were kept open after the ...

<table>
<thead>
<tr>
<th>Which breakout rooms would you participate in if this online space were kept open after the workshop? (check all that apply)</th>
<th>Counts</th>
<th>Percents</th>
</tr>
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<tbody>
<tr>
<td>IPY Plans</td>
<td>25</td>
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<td>K-Graduate Education</td>
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<tr>
<td>Funding</td>
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</tr>
<tr>
<td>Field Experiences</td>
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</tr>
<tr>
<td>Education technology and digital media</td>
<td>16</td>
<td>41.0%</td>
</tr>
<tr>
<td>Informal Education</td>
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<td>38.5%</td>
</tr>
<tr>
<td>Young Scientists</td>
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<td>38.5%</td>
</tr>
<tr>
<td>Diverse Audiences</td>
<td>11</td>
<td>28.2%</td>
</tr>
<tr>
<td>Data communication</td>
<td>10</td>
<td>25.6%</td>
</tr>
<tr>
<td>Art Gallery</td>
<td>8</td>
<td>20.5%</td>
</tr>
<tr>
<td>Arctic Residents</td>
<td>7</td>
<td>17.9%</td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
<td>n/a</td>
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</table>

Q16: My expectations for this workshop were met.
### Executive Summary

My expectations for this workshop were met.

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<th>Counts</th>
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</thead>
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<tr>
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<td>23.1%</td>
<td>![Chart]</td>
</tr>
<tr>
<td>Agree</td>
<td>15</td>
<td>38.5%</td>
<td>![Chart]</td>
</tr>
<tr>
<td>Neutral</td>
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</tr>
<tr>
<td>Disagree</td>
<td>4</td>
<td>10.3%</td>
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</tr>
<tr>
<td>Strongly Disagree</td>
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<td>0.0%</td>
<td>![Chart]</td>
</tr>
<tr>
<td>Totals</td>
<td>39</td>
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<td>![Chart]</td>
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</table>

### Q17: The amount and type of interaction among participants satisfied my needs.

The amount and type of interaction among participants satisfied my needs.

<table>
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<th>Percents</th>
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<tr>
<td>Agree</td>
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<tr>
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<tr>
<td>Disagree</td>
<td>1</td>
<td>2.6%</td>
<td>![Chart]</td>
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<tr>
<td>Strongly Disagree</td>
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<td>0.0%</td>
<td>![Chart]</td>
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<tr>
<td>Totals</td>
<td>39</td>
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<td>![Chart]</td>
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</table>

### Q18: Online interactions with other participants enabled me to make connections that I will continue to use in the future.

Online interactions with other participants enabled me to make connections that I will continue to use in the future.

<table>
<thead>
<tr>
<th>Counts</th>
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<tbody>
<tr>
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<td>46.2%</td>
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<tr>
<td>Neutral</td>
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<tr>
<td>Totals</td>
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### Q19: Navigation through the online workshop was satisfactory and easy to learn.
### Executive Summary

Navigation through the online workshop was satisfactory and easy to learn.

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<tr>
<td>Agree</td>
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<tr>
<td>Neutral</td>
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<td>23.7%</td>
</tr>
<tr>
<td>Disagree</td>
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<td>5.3%</td>
</tr>
<tr>
<td>Strongly Disagree</td>
<td>0</td>
<td>0.0%</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td>38</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

**Q20:** Please use the space below to add any other comments you have, suggestions for future workshops...

Please use the space below to add any other comments you have, suggestions for future workshops, or any other ideas you would like to share with us.

- continue the effort! thanks a lot
- build online presence
- Maybe I missed the area that identified the desired outcomes for this workshop. A lot is going on, which is important, but I don't feel a sense of direction yet. Perhaps IPY is too big for my brain to get around, but I participated in the bridging the Gap workshop in Washington and the desired goals of IPY seem to be right on track. Just seems the pathway to get there hasn't been revealed or we haven't found it together yet.
- "I like the on line workshop for two significant reasons: I could easily go back to a participant's input after reflecting to check for understanding and secondly, the ability to attend in all the "rooms" enabled me to become aware of the ingredients contributing to the big picture. At a site conference attending to all sessions of interest is humanly impossible. "I wondered why one room was terminated to email. Too esoteric? Or was a direction beginning between principals? "In a face to face meeting of a person one doesn't get to really know what an individual stands for. ICE allowed for a cutting to the quick to arrive at the intent of an individual, crisply. "I will continue to participate with developing sub concepts within the framework of the themes. "I would like to gather and celebrate with the people who shared so eloquently and selflessly and to personally thank the organizers of ICE.
- The second week seemed to loose some steam and it was much harder to follow what was going on. I don't know if some "rooms" should have been closed so that people get focused on week 2.
- there were too many items to follow and I feel that many participants did not follow some of the items due to the complexity of the structure.
- Your workshops are always the best!
- This experience was different than other on-line workshop / learning experiences that I have taken part in. If I were to name this experience now that I have participated, I would call it more of a forum that a workshop. I did learn from the exchange of ideas; but I'm not sure what was accomplished for the time that was invested. It didn't seem to me that we stayed "on-track" with the stated purpose of the workshop.
- I was simply unable to keep current with the wonderful discussions. There was so much to take in, I was afraid to respond to any one comment until I read them all knowing that what I wished to say might have already been said in a later entry. It was amazing just to lurk and learn on the side. Living in the metro New Orleans area, currently in an apartment in Baton Rouge, the hip bone game beginning with the Antarctic - New Orleans connection is something I have shared with lots of science and math teachers in the past 10 days.
- Keep going! We need more biologists and an inter-disciplinary approach.
- I found out about this workshop because I was already in touch with the National Science Foundation about IPY funding. Maybe there is a way to connect with other radio or media people and get them involved. For example the DACS is way that all public radio stations and networks say in touch in the U.S. There are also public broadcasting journals etc.
- I didn't have as much time as I would have liked to participate in the workshop. I found that in some cases people got way off track, or focussed on a very small part of an issue, to the exclusion of all other relevant parts. However, since I was unable to find more time to contribute, I wasn't able to help steer discussions into more overarching territory.
- I was able to participate on a regular basis for about 3/4 of the workshop. During the last 1/4 I was too busy with other things
Executive Summary

to log in regularly. I felt that this was unfortunate and my loss. I am glad that we will still have access. I enjoyed facilitating one of the breakout groups. However, I felt that we had many other interesting alternatives and it took more time than I would have liked to figure out where I was going to spend most of my time. Even at that, I found it difficult to participate in more than one breakout group in a meaningful way.
• It was great to have this forum to connect with others in a similar field of interest. I found it awkward to communicate in the various meetings, having to check back for a reply, without knowing if a reply had been posted to my specific email. The amount of discussion made it impossible to keep abreast of anything. I came away with contacts with whom I will maintain. I will probably return to research funding opportunities, since I did not discover that the first time around.
• Bravo for the initiative! Please see the discussions for a nice model of conversation tracking/responding (www.apple.com/support).
• I'm really enthused about this feedback from the workshop in Brussels. Perhaps it will be possible to show first proposals on the next workshops in the groups (especially for all ideas to keep the communication and to build up such a portal we discussed).
• Great job!
• Nice work - thanks.
• I was never sure of the direction where it was heading and what the outcomes should be. I guess I am a goal-oriented person and I found that lacking or unclear.
• Number of participants was too large - it became very time consuming to keep up - 2wks seemed too long - I personally had to move on to other things - as time extended, only a relatively small number of the 120 voices were being heard. What about a cut-off date for new attendees? I was reading new introductions on the last 2 days of the workshop. I was looking for agreement on 5-6 key concepts that we could start developing unified messages around. I am a bit worried that without a unified focus we will either overwhelm the education community and Arctic residents, or we will fall short of the potential to raise awareness using IPY as the hook. I was looking for new contacts and ideas - the forum was beneficial in that area - new names that I will follow up with - new programs (to me) that are already out there that I would like to follow up with - links to already existing lesson plans that fit our program. There is a lot out there already - it would have been nice to instruct people to keep the intro short and add a web link to their programs or projects.
• I would have appreciated hearing more from planetary geologists. Specifically, the search for meteorites is a high interest area.
• There were too many places. The conversations in many of the rooms overlapped so that if you were participating in the wrong room, it was easy to miss key stuff. Streamline!!!
• If I find myself wondering how far the "products" from the conference got in development? Will there be access to those still? Will the compilation be completed? Can we continue to work on this as a group?
• Focus, focus, focus! Having said that... GREAT JOB on a very difficult task. Well done. I would participate again.
• I really enjoyed this workshop. I found that I could use a great deal of the work, but I think there were too many different streams going at one time. I found that could only follow a few streams at a time and when I explored other ones, the work being done there would have "cross pollinated" and improved our work. I think some opportunities were missed. However, I don't want the criticism to diminish the positives, only I wished they could have been even more positive.
• Thank you very much, Peter!
• I really like the idea of keeping the workshop open... perhaps sending a note to participants once every 2 weeks, or month, like we received daily during the workshop. It was a great way to find out what was going on and start to build partnerships. I didn't get a chance to explore every part of the workshop that I would have liked to due to time constraints, so keeping the workshop open would really help. Like how it was broken down into categories. It was my first virtual workshop, so I didn't know what to expect... but have now tapped my toes in the water and am looking forward to more. Thanks.
• It was the first time for me to experience this type of conference. I was at first skeptical about its effectiveness, because the responses are not instant. But after I experienced it, I can see the value of it, and am convinced of its effectiveness.

Q21: May we contact you in the future for further feedback about your experience at this workshop...
May we contact you in the future for further feedback about your experience at this workshop in order to support assessment of long-term impacts?

<table>
<thead>
<tr>
<th></th>
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<th>Percents</th>
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**Q22: NetCollect Pages**

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<tr>
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</tr>
</tbody>
</table>
Appendix IV

Visitation Data

This appendix includes two bar graphs displaying the detailed data on visitation rate counts and final day of visitation.
How Many Breakouts Did a Participant Visit Over the Course of the Workshop?