August 14, 2002

IMSA 2061 Program Year 2001-2002 Summary Report

Steven R Rogg
The Illinois Mathematics and Science Academy and Project 2061 each began their work in 1985 – the year Halley’s Comet passed close to the earth. Children starting school now will see the return of the comet in 2061 – a reminder that today’s education will shape the quality of their lives as they come of age in a new century.
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<table>
<thead>
<tr>
<th>Organization/Unit</th>
<th>Universal Resource Locator (URL)</th>
</tr>
</thead>
<tbody>
<tr>
<td>American Association for the Advancement of Science</td>
<td><a href="http://www.aaas.org/">http://www.aaas.org/</a></td>
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<tr>
<td>Project 2061</td>
<td><a href="http://www.project2061.org/">http://www.project2061.org/</a></td>
</tr>
<tr>
<td>Illinois Mathematics and Science Academy (IMSA)</td>
<td><a href="http://www.imsa.edu/">http://www.imsa.edu/</a></td>
</tr>
<tr>
<td>Center @ IMSA</td>
<td><a href="http://www.imsa.edu/center/">http://www.imsa.edu/center/</a></td>
</tr>
<tr>
<td>Office of Research and Evaluation</td>
<td><a href="http://www.imsa.edu/team/re/">http://www.imsa.edu/team/re/</a></td>
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</table>
# CONTENTS

OVERVIEW ..................................................................................................................................................1

INTRODUCTORY WORKSHOPS ..................................................................................................................3
   ABOUT THE INTRODUCTORY WORKSHOPS .........................................................................................3
   INTRODUCTORY WORKSHOPS CONDUCTED IN 2001-2002 .................................................................4
      Workshop Participants ..........................................................................................................................4
      Initial Perspectives: Reflecting on Day One .......................................................................................5
      Workshop Evaluation: ISBE Form 77-21 .........................................................................................8
      Workshop Evaluation: IMSA 2061 Themes .....................................................................................11

IMSA 2061 COHORT PROGRAMS .............................................................................................................13
   ABOUT THE COHORT PROGRAMS .........................................................................................................13
      Formation of Cohort Groups ..............................................................................................................13
      Development of Database Utility ......................................................................................................13
      Cohort Program Meetings Evaluation ...............................................................................................14
   ACTIVE COHORT: CRETE MONEE C.U.S.D. 201U ..............................................................................15
   ACTIVE COHORT: WEST SUBURBAN CONSORTIUM FOR ACADEMIC EXCELLENCE (WSCAE) ...17
   POTENTIAL COHORTS ............................................................................................................................19
      Frankfort/Lincoln Way .....................................................................................................................19
      MECCA ...............................................................................................................................................19
      Homewood Flossmoor C.H.S.D. 233, Oak Lawn-Hometown School District 123, Indian Prairie
      C.U.S.D. 204 ..................................................................................................................................20

WHAT WE ARE LEARNING .........................................................................................................................21

SELECTED REFERENCES ............................................................................................................................23

APPENDICES ..............................................................................................................................................25
   APPENDIX A: SAMPLE AGENDA FOR A 2-DAY SESSION ....................................................................26
   APPENDIX B: ANALYSIS OF RESPONSE DISTRIBUTIONS ...............................................................27
      Introductory Workshops ....................................................................................................................27
      Cohort Programs ................................................................................................................................27
      Cohort Program: Crete-Monee ...........................................................................................................31
      Cohort Program: WSCAE ..................................................................................................................32
      About Reading Box Plots ...................................................................................................................34
   APPENDIX C: STATISTICAL TESTS OF IMSA 2061 THEMES .............................................................39
   APPENDIX D: INSTRUMENTS ..................................................................................................................41
      Center@IMSA Program Participant Information Form (Registration) .............................................42
      Initial IMSA 2061 Cohort Needs Assessment .................................................................................44
      ISBE Form 77-21: “Evaluation and Evidence of Completion... ” .....................................................45
      Reflections on Day One (Introductory Workshop) ..........................................................................46
      Reflecting on the Introduction to Project 2061 Workshop (Post-Workshop) ....................................48
      Reflecting on the Introduction to Project 2061 Workshop (Pre and Post) .........................................49
   APPENDIX E: SAMPLE PARTICIPANT COMMENTS .............................................................................51
      ISBE Form 77-21 ................................................................................................................................51
      IMSA 2061 Reflections on Day One .................................................................................................57
TABLES

Table 1: Summary of Introductory Workshops and Participant Registrations ..............................................4
Table 2: Introductory Workshops Participant Race and Gender Distribution ..................................................5
Table 3: Introductory Workshops Participants’ Professional Roles ..................................................................5
Table 4: Count of Suggestions for Improving Presentation Style by Session ..............................................11
Table 5: Crete-Monee Cohort Participation by Session Date ........................................................................32
Table 6: Participation in the Crete-Monee Cohort by School ........................................................................32
Table 7: Crete-Monee Cohort Participant Race and Gender Distribution ....................................................32
Table 8: Crete-Monee Cohort Participants’ Professional Roles .......................................................................32
Table 9: WSCAE Participation by Session Date ............................................................................................34
Table 10: WSCAE Cohort Districts and Schools Represented .......................................................................34
Table 11: WSCAE Cohort Participant Race and Gender Distribution ..........................................................34
Table 12: WSCAE Cohort Participants’ Professional Roles .............................................................................34

FIGURES

Figure 1: ISBE Form 77-21 Likert-Type Items for Introductory Programs ......................................................9
Figure 2: Categories Suggested by Free-Format Responses to ISBE Form 77-21 .............................................9
Figure 3: Participants’ Familiarity with Project 2061 Themes: Pre/Post Comparison ......................................11
Figure 4: Participants’ Familiarity with Local Themes: Pre/Post Comparison ..............................................12
Figure 5: ISBE Form 77-21 Likert-Type Items for Cohort Programs .............................................................14
Figure 6: Distributions for ISBE 77-21 Likert-Type Items for Introductory Programs ..................................27
Figure 7: Introductory Workshop ISBE Likert-Type Items by Session Date ...............................................27
Figure 8: Examples of Potential Outlier Responses to ISBE Form 77-21 .......................................................28
Figure 9: Distributions for Participants’ Familiarity with Project 2061 Themes ............................................29
Figure 10: Distributions for Participants’ Familiarity with Local Themes ...................................................30
Figure 11: ISBE Form 77-21 Likert-Type Items for Cohort Programs .........................................................31
Figure 12: Cohort Programs ISBE Likert-Type Items by Session Date .......................................................31
Figure 13: Ethnic Composition of Crete-Monee CU201U Schools, District, and State ...............................33
Figure 14: Key Indicators for Crete-Monee Cohort Schools .......................................................................33
Figure 15: Ethnic Composition of WSCAE Schools and State .................................................................35
Figure 16: Key Indicators for WSCAE Cohort Schools .............................................................................36
Year One Summary Report

IMSA 2061
A Unique Partnership of IMSA and Project 2061

OVERVIEW

In 2000 IMSA and the American Association for the Advancement of Science’s Project 2061 established a partnership, IMSA 2061, to offer unique and nationally recognized professional development programs for mathematics and science teachers and education leaders. Participants in the IMSA 2061 professional development programs learn to use the tools, research, and experiences of education reform to enable all students to achieve the learning expressed in state and national standards.

Activities described in this report fall into two categories, Introductory Workshops and long-term programs with districts. IMSA 2061 Introductory Workshops help educators become aware of how to apply Project 2061 publications in their districts. Through its long-term school/district programs, IMSA 2061 facilitates the use of science education research, Project 2061 publications, and state and national standards to help schools/districts meet their goals of developing coherent science curricula, implementing instructional practices aimed at helping students overcome misconceptions and obtaining an understanding of important science concepts, and designing assessments that measure students’ understanding of science concepts.

As teachers, schools, and districts implement change, IMSA 2061 will study and report the impact of professional development on teachers, classrooms, and school-wide practices and on student learning. It also will help schools/districts to design and implement their own research plans to assess the impact of this professional development as well as the impact on student achievement in science of the changes that they implement.
INTRODUCTORY WORKSHOPS

ABOUT THE INTRODUCTORY WORKSHOPS

The IMSA 2061 Introductory Workshop was designed to help teams of teachers and administrators discover how to put the latest education research into practice as they experience the power of the Project 2061 tools (e.g. *Science for All Americans*, *Benchmarks for Science Literacy*, and *Atlas of Science Literacy*) to improve their science curriculum and instruction. The workshop was originally designed to serve as a marketing tool for the long-term professional development offered by IMSA 2061, and there was no charge for the workshop. This model changed slightly during the course of the year as IMSA 2061 partnered with Illinois Regional Offices of Education (ROE) to offer these workshops to a broad audience. In these cases, the ROE paid a flat rate for IMSA to conduct the workshops.

The Introductory Workshop is a modified form of Project 2061’s FOCUS Workshop. The IMSA 2061 Introductory Workshop is a two-day experience while Project 2061’s FOCUS Workshop is a three-day experience. IMSA 2061 personnel thought that some of the textbook analyses and use of trade books could be better addressed in the context of the long-term professional development that the Introductory Workshop is supposed to encourage.

The workshop is designed to provide school or district teams with opportunities to learn how to apply Project 2061 tools to materials from their districts. Such applications are wide ranging, encompassing everything from designing standards-based lesson plans for individual teachers, to revising entire K-12 science programs (e.g. better coherence and articulation of concepts across grade levels). The correlation of these materials with Illinois Learning Standards is discussed.

As a result of this workshop, participants should have sufficient information about IMSA 2061 to make an informed decision about whether or not to continue working with IMSA in long term, customized professional development on the application of Project 2061 tools in their districts and the assessment of the impact of changes they make as a result of this professional development on student achievement in science.
The first Introductory Workshop was held at IMSA on May 1-2, 2001. Twenty-nine educators from four school districts and two consortia attended this workshop (see Table 1). Districts and consortia represented were: Homewood Flossmoor Consolidated High School District (C.H.S.D.) 233, Oak Lawn-Hometown School District 123, Indian Prairie Consolidated Unit School District (C.U.S.D.) 204, Crete Monee C.U.S.D. 201U, the West Suburban Consortium for Academic Excellence (WSCAE), and the Metro East Consortium for Child Advocacy (MECCA). Additionally a representative from the West 40 Intermediate Service Provider (ISP) attended the workshop.

All of these districts and consortia had contacted IMSA asking for help with science education in their districts and were invited by IMSA to attend this workshop. Teams were composed of groups of teachers (Homewood Flossmoor and Indian Prairie), teams including teachers and administrators (Oak Lawn and Crete Monee), representatives of a consortium (MECCA), and a group of superintendents from a consortium (WSCAE) accompanied by a representative from the West 40 ISP with whom they work closely.

Table 1: Summary of Introductory Workshops and Participant Registrations

<table>
<thead>
<tr>
<th>Start Date</th>
<th>End Date</th>
<th>Sponsor</th>
<th>Location</th>
<th>Registrations</th>
</tr>
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<tbody>
<tr>
<td>5/1/01</td>
<td>5/2/01</td>
<td>IMSA</td>
<td>IMSA, Aurora, IL</td>
<td>24</td>
</tr>
<tr>
<td>6/19/01</td>
<td>6/20/01</td>
<td>WSCAE</td>
<td>Riverside, IL</td>
<td>29</td>
</tr>
<tr>
<td>8/16/01</td>
<td>8/17/01</td>
<td>Frankfort</td>
<td>Frankfort, IL</td>
<td>11</td>
</tr>
<tr>
<td>10/25/01</td>
<td>10/26/01</td>
<td>Regional Offices of Education</td>
<td>IMSA, Aurora, IL</td>
<td>34</td>
</tr>
<tr>
<td>3/18/02</td>
<td>3/19/02</td>
<td>Lake County (Abbott Laboratories Fund)</td>
<td>Mundelein, IL</td>
<td>53</td>
</tr>
<tr>
<td>4/16/02</td>
<td>4/17/02</td>
<td>Regional Offices of Education</td>
<td>Lombard, IL</td>
<td>60</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td></td>
<td><strong>211</strong></td>
</tr>
</tbody>
</table>

IMSA 2061 has conducted five more Introductory Workshops since May 2001. Of these, two were conducted for specific school districts or consortia. These were offered at no cost since the districts and consortia had expressed interest in long-term IMSA 2061 professional development and were using this workshop to educate teachers and administrators about the potential of such work. These workshops were held for teachers and administrators from WSCAE in June 2001 and for teachers and administrators from Frankfort (elementary district) and Lincoln Way East (the high school district into which it feeds) in August 2001. Two workshops were held in conjunction with the DuPage County Regional Office of Education (ROE) as well as other ROEs with whom they coordinated. These were held in October 2001 and April 2002. Additionally, a workshop that encompassed both mathematics and science was held in Lake County with funding from the Abbott Laboratories Fund.

**WORKSHOP PARTICIPANTS**

An overview of the race, gender, and professional role profile of Introductory Workshop participants is provided in Table 2 and Table 3, below. Notice that the proportion of
administrators to teachers (27:175) reflects the program policy of encouraging the participation of school teams that include an administrative representative.

Table 2: Introductory Workshops Participant Race and Gender Distribution

<table>
<thead>
<tr>
<th>Race</th>
<th>Female</th>
<th>Male</th>
<th>TOTAL</th>
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</thead>
<tbody>
<tr>
<td>Black or African American</td>
<td>6</td>
<td>3</td>
<td>9</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>1</td>
<td>2</td>
<td>3</td>
</tr>
<tr>
<td>White (not Hispanic or Latino)</td>
<td>147</td>
<td>41</td>
<td>188</td>
</tr>
<tr>
<td>White and American Indian or Alaska Native</td>
<td>1</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(blank)</td>
<td>10</td>
<td>10</td>
<td>20</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>165</td>
<td>46</td>
<td>211</td>
</tr>
</tbody>
</table>

Table 3: Introductory Workshops Participants’ Professional Roles

<table>
<thead>
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<th>Primary Role</th>
<th>Registrations</th>
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<td>Administrator</td>
<td>27</td>
</tr>
<tr>
<td>Library Resource</td>
<td>1</td>
</tr>
<tr>
<td>Teacher</td>
<td>175</td>
</tr>
<tr>
<td>Tech Coordinator</td>
<td>2</td>
</tr>
<tr>
<td>Other</td>
<td>6</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>211</td>
</tr>
</tbody>
</table>

**INITIAL PERSPECTIVES: REFLECTING ON DAY ONE**

The main sections of the first day of the Introductory Workshop are: (1) Need for Change; (2) Project 2061 Tools (and History); (3) Benchmark Study Procedure; and, (4) Model Lessons. Participants are asked to respond to free-response items about these activities at the beginning of the second day of the workshop. This information is used on the second day as a means to respond to participants’ questions and concerns, and to clear up any apparent misunderstandings. In addition, these items indicate something about how participants respond to the first day of the program. Some of our observations from the Reflecting on Day One questionnaire are summarized here. The instrument itself is reproduced in the appendices (page 46) as are sample responses (beginning on page 57).

**Need for Change**

The presentation of portions of *A Private Universe* or the student responses from *Midnight City* convinces most teachers that even the best students are not learning science concepts in school and often surprises them as well. Some, however, continue to question the methods and validity of the study. While only a relatively small minority, it is our experience that this sometimes colors their views on the entire. In general, teachers tend to be convinced about the persistence

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1 The questionnaire is given at the start of the second day because it allows the over-night for participants to reflect on the activities of the previous day, because it may be less rushed than if it were done at the end of day one, and because doing so seems to help tie the two days together.

of student misconceptions. Moreover, teachers respond openly about their personal insights as illustrated in the following quotation.

“I loved this- I realized that the mass of the tree comes from Carbon Dioxide- a gas in the air! That blew me away and I am sure it will blow my kids away when I show them this.” (Participant)

**Project 2061 Tools**

Overwhelmingly, teachers perceive the Project 2061 tools as valuable. There is, however, some concern regarding the need to: (1) have personal access to the tools (i.e., be given them); (2) have time to read and use them; and, (3) ensure the cooperation of others, including teachers, administrators, and parents. These concerns are best illustrated by what the participants themselves wrote...

“Informative, however, I don't think these books will have much meaning to regular classroom teachers. They would not be interested with their limited amount of time. I think workshops would be necessary for all teachers who teach science, not just science teachers. Also, administrators need to be in on this.”

“Project 2061 makes sense. I often feel that my students just don't get it or are not working hard enough. Trimming curriculum and focusing on understanding of key concepts would build a strong foundation for further learning. I believe that many of the adults that I know are not scientifically literate.”

“Books are helpful, and unlike other curriculum areas, at least we have help. Concerns about the time needed to feel comfortable with the tools and if the district will think we are capable of using them w/o guidance. °Tools need to be used as a team.”

“Science of All Americans is a book that explains basic science ideas in easy to understand language. Every science teacher should have a copy.”

“Where were these wonderful tools 3 years ago when I was faced with the task of redoing the curriculum and making decisions on what should be taught?”

Finally, some of the primary concerns and questions of participants are summarized in this list.

- Teachers may lack the content knowledge required to use the tools.
- Use of these tools requires time.
- “How effective is the strand map when the schools don't work together?”
- “How do the IL standards mesh with the benchmarks?”
- What is the potential harm of changing (pruning) the curriculum?
- Teachers may not dedicate themselves to use the tools with sufficient mastery.
- “Why hasn't Science for All Americans been widely distributed?”

**Benchmark Study Procedure**

Participants saw the Benchmark Study Procedure as an instructional device employed by the presenters to illustrate how the Project 2061 books connect to each other. Participants also begin to show understanding of the Benchmark Study Procedure as a fundamental method for
understanding the benchmarks and their interdependencies. It is common for participants to express concern about how the benchmarks are related to the Illinois Learning Standards. They do not express awareness that benchmarks and the Benchmark Study Procedure can be used to *elucidate* the Illinois Learning Standards. Of particular concern were topics found in the Illinois Learning Standards (i.e., on which students will be tested) that are not in *Benchmarks for Science Literacy*.

**Model Lesson: Insights/Discoveries**

The model lessons help teachers begin to appreciate the way science instruction might look if teachers helped students directly confront misconceptions and provided experiences to build scientific concepts. Some participants expressed a desire to be provided exemplary lessons to implement in their own classrooms. Some felt that less time should be spent experiencing the lessons—that a brief explanation would suffice. In general, teachers valued (and sometimes expected) *experiencing* conceptual change, *witnessing* the modeling of pedagogical content knowledge (PCK), *using* the Project 2061 tools, and *having* lessons to apply in their own classrooms.

> “The lessons were thought providing. They made me look at things in a different light and see that I could connect things in a different manner.”

> “Want activities that can be used, but do not dwell too much on a lesson.”

> “I can't wait to try the systems strategy! Thank You for making me THINK!” (Systems was especially effective)

**Other Thoughts**

The questionnaire also included a section for “other thoughts.” Because the response is voluntary and free-format, it is not possible to determine the extent to which the whole group shares the perspectives offered. It is clear enough, however, that the vast majority found the first day to be of value, albeit not everyone was satisfied. Some differences in responses might be attributable to varied expectations at the start of the two-day workshop. In talking to teachers, it appeared that those who thought the workshop would provide specific lessons for each grade level that could be used “as is” in their classrooms tended to be less satisfied with the workshop. However, even some of these teachers were satisfied when they became convinced of the usefulness of the Project 2061 tools. Teachers who expected a broader, more in-depth approach to curriculum and instructional reform tended to be more satisfied with the workshop.

Other reflections on this portion of the workshop included: the idea that "less is better," the realization of the need for curriculum articulation to help students build their understanding of scientific concepts over time, and the need to help students build conceptual knowledge to eliminate the repetition of technical vocabulary without an understanding of its meaning. There is also a desire for exemplary lessons that are explicitly aligned with Illinois Learning Standards. Participants also tend to quickly recognize the relevance for their local situation:

> “We are in the middle of a textbook adoption and I realized yesterday that we (i.e., the school district) need to wait or prolong the adoption until we're truly ready.”

(Participant)
Teachers leave the first day with many important questions and concerns. Those that are expressed most often are summarized in the following list.

- How to educate others about the persistence of student misconceptions
- How to refocus on “student centered learning as opposed to teacher directed teaching”
- Where to find good materials
- How to determine what content is not necessary
- How to find the time and resources required for change
- How to detect (assess for) student misconceptions
- Need for tangible resources to use in the classroom
- How to respond to the perceived lack of content knowledge among teachers

**WORKSHOP EVALUATION: ISBE FORM 77-21**

The Introductory Workshops were evaluated using the Illinois State Board of Education (ISBE) Form 77-21, entitled: “Evaluation and Evidence of Completion for Workshop, Conference, Seminar, Etc.” Use of this form is required by the ISBE for those teachers seeking Continuing Education Units for completing in the workshop. An image of this instrument is provided in the appendices, page 44.

Analysis of the Likert-Type items shows clearly that participants tend to be highly satisfied with these workshops. Looking at Figure 1, we see that the mean for each item is, in each case, between Somewhat Agree (4.0) and Strongly Agree (5.0). The distributions of the responses also tend toward the upper extreme of the scales. Most evident is the especially high distribution on Item 3, suggesting a remarkably high degree of confidence in the “education and experience in the subject matter” of the IMSA 2061 personnel.

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3 IMSA is approved by the Illinois State Board of Education as a provider for IMSA 2061 workshops. Introductory Workshops provide teachers with the CEU option. Other approved providers, such as the Regional Offices of Education, may opt to broker CEU credit when they sponsor the workshop. In this case, we ask for copies of the evaluation forms.
### Figure 1: ISBE Form 77-21 Likert-Type Items for Introductory Programs

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Std. Dev.</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The activity increased my knowledge and skills in my areas of certification, endorsement or teaching assignment.</td>
<td>140</td>
<td>1.11</td>
<td>4.16</td>
</tr>
<tr>
<td>2. The relevance of this activity to ISBE teaching standards was clear.</td>
<td>141</td>
<td>1.02</td>
<td>4.32</td>
</tr>
<tr>
<td>3. It was clear that the activity was presented by persons with education and experience in the subject matter.</td>
<td>142</td>
<td>0.76</td>
<td>4.75</td>
</tr>
<tr>
<td>4. The material was presented in an organized, easily understood manner.</td>
<td>142</td>
<td>1.06</td>
<td>4.19</td>
</tr>
<tr>
<td>5. The activity included discussion, critique, or application of what was presented, observed, learned, or demonstrated.</td>
<td>141</td>
<td>0.80</td>
<td>4.58</td>
</tr>
</tbody>
</table>

Note that analysis of item distributions revealed potential outlier responses. There are, for example, nine potential outliers recorded as “Strongly Disagree” (1.0) for the first item. Some of the responses to the corresponding open-ended questions suggest dissatisfaction with the workshop while some do not. This review indicates that some teachers had mistakenly applied the scale in reverse. Although we chose to include all responses in the analysis, removal of outliers confirmed in this way would increase the mean scores to even higher levels.

### Figure 2: Categories Suggested by Free-Format Responses to ISBE Form 77-21

<table>
<thead>
<tr>
<th>Best Features (N=130)</th>
<th>Count</th>
<th>Suggestions (N=91)</th>
<th>Count</th>
<th>Comments (N=49)</th>
<th>Bias (count)(^4)</th>
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<tr>
<td>Tools/Resources</td>
<td>38</td>
<td>Presentation Style</td>
<td>41</td>
<td>Appreciation</td>
<td>- 0 +</td>
</tr>
<tr>
<td>Professional Interaction</td>
<td>37</td>
<td>Activities/Content</td>
<td>35</td>
<td>Accommodations</td>
<td>4 0 8</td>
</tr>
<tr>
<td>Relevancy/Utility</td>
<td>36</td>
<td>Relevance/Utility</td>
<td>8</td>
<td>Presentation Style</td>
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<tr>
<td>Activities/Content</td>
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<td>Instructions</td>
<td>6</td>
<td>Activities/Content</td>
<td>4 1 1</td>
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<tr>
<td>Skills</td>
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<td>None!</td>
<td>6</td>
<td>Articulation</td>
<td>6</td>
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<tr>
<td>Presenter(s)</td>
<td>11</td>
<td>Schedule</td>
<td>6</td>
<td>Articulation</td>
<td>6</td>
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<td>Awareness</td>
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<td>Accommodations</td>
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<td>Schedule</td>
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<tr>
<td>Presentation Style</td>
<td>10</td>
<td>Materials</td>
<td>3</td>
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</tr>
<tr>
<td>Teaching Methods</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodations</td>
<td>2</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: A total of 142 surveys were completed for Introductory Workshops.

\(^4\) For free-response comments, the counts are further subdivided according to the suggestion of a positive (expressing satisfaction), neutral (comment), or negative (expressing dissatisfaction) bias.
In order to identify potential trends in the open-response items of ISBE Form 77-21, each response was read and assigned to one of more categories. The categories were emergent, suggested by the data, rather than determined *a priori*. Some categories tended to occur in two or even all three open-ended items (i.e., both as a “best feature” and as a “suggestion for improvement”). Some categories were unique to individual items. A summary of the resulting categories is provided as Figure 2.

**Tools/Resources:** A valued feature of the Introductory Workshop are the Project 2061 tools and resources. Note that this category appears at the top of the sorted list of “Best Features” (Figure 2) and it does not appear among the categories for “Suggestions for Improvement”. The appreciation for these tools is also evident in the free-response comments. Participant responses for this category are provided in *Appendix E: Sample Participant Comments*, page 51.

**Professional Interaction:** The opportunity to interact with colleagues within- and between districts is also highly valued. This category was also subdivided into a category “Articulation” in those instances where participants specifically identified the value of working across grade levels Refer to page 52 for the actual comments for this category.

**Relevance/Utility:** A third feature of the workshops is their perceived relevance or utility for the participant’s and their school district. This is a category that appears in both the “Best Features” item as well as among “Suggestions for Improvement”. Comparison of responses in these categories shows that indeed the workshop is generally perceived as relevant for participants. Some participants however, desire more detail, more applications explicitly tied to individual assignments, and more immediacy - including lesson plans, explicit correlations to the Illinois Learning Standards, and fit with the full local curriculum (see page 53).

**Activities/Content:** References to the workshop activities and content were evident in all three open-ended items. The comments in this category seem to illustrate a challenge for the Introductory Workshop to meet a diverse range of needs. These include:
- numerous examples and applications that span the entire K-12 curriculum; *and*,
- tangible and exemplary lesson plans, lessons and curricular units; *and*,
- explicit demonstration of the alignment of benchmarks (learning goals) with the Illinois Learning Standards and expectations of the Illinois Standards Achievement Test; *and*,
- sensitivity to varied contexts of- and multiple demands on teachers, schools, and districts.

**Presenter(s) and Presentation Style:** As was evident in the Likert-Type items (Page 9, Figure 1, Item 3), IMSA 2061 presenters are seen as “persons with education and experience in the subject matter.” Likewise, the category “Presentation Style” is cited as a “Best Feature” of the workshop. This same category, however, tops the list of suggestions for improvement (see Figure 2, page 9 and responses in the Appendix, page 54). It is, therefore, helpful to contrast the responses for the items assigned to this category.

A closer look at the survey responses shows an event-specific pattern (Table 4). Two events have a higher share of suggestions for improvement related to presentation style. Both are Introductory Workshops that were conducted as contracts to Regional Offices of Education. Moreover, these were larger groups (Table 4) that also recorded complaints about problems experienced with accommodations/facilities (see page 56). Still, responses to this category
should be considered seriously given that, overall, approximately 22% of participants comment on some aspect of presentation style when invited to suggest ways to improve the Introductory Workshops.

**Table 4: Count of Suggestions for Improving Presentation Style by Session**

<table>
<thead>
<tr>
<th>Start Date</th>
<th>Provider</th>
<th>Location</th>
<th>Category</th>
<th>Registration Count</th>
<th>Percent of Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>6/19/01</td>
<td>WSCAE</td>
<td>Riverside, IL</td>
<td>4</td>
<td>29</td>
<td>14%</td>
</tr>
<tr>
<td>8/16/01</td>
<td>Frankfort</td>
<td>Frankfort, IL</td>
<td>1</td>
<td>11</td>
<td>9%</td>
</tr>
<tr>
<td>1/16/02</td>
<td>WSCAE</td>
<td>Riverside, IL</td>
<td>3</td>
<td>34</td>
<td>9%</td>
</tr>
<tr>
<td>3/18/02</td>
<td>Lake County Educational Services</td>
<td>Mundelein, IL</td>
<td>13</td>
<td>53</td>
<td>25%</td>
</tr>
<tr>
<td>4/16/02</td>
<td>ROE</td>
<td>IMSA</td>
<td>20</td>
<td>60</td>
<td>33%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td>41</td>
<td>187</td>
<td>22%</td>
</tr>
</tbody>
</table>

**WORKSHOP EVALUATION: IMSA 2061 THEMES**

In addition to the ISBE Form 77-21, the IMSA 2061 workshops implemented a pre- and immediate post-workshop questionnaire entitled “Reflecting on Teaching and Student Learning” (page Error! Bookmark not defined.). The form of this instrument used for the Introductory Workshops has two main parts: a baseline survey of teaching practices and learning environment, and an assessment of participants’ self-reported familiarity with the principle themes of the workshop.

The questionnaire contains a list of items representing six primary themes of the Introductory Workshop. The page is structured to allow participants to respond to a Likert-type scale and also to provide a free-response explanation. These responses serve as a means to “assess what the learner already knows” coming in to the workshop. In addition, these items are repeated on the post-workshop questionnaire in order to determine the extent that participants report growth in understanding of these themes.

**Figure 3: Participants’ Familiarity with Project 2061 Themes: Pre/Post Comparison**

The first three of the six themes relate to participants’ familiarity with foundational Project 2061 concerns and tools. Figure 3 clearly shows two patterns: (1) that participants, in general, came to the Introductory Workshop with little “understanding” of these Project 2061 ideas and tools;
and (2) that participants report markedly greater understanding immediately after the workshop\(^5\). Results of paired t-tests confirm that the pre/post gain is statistically significant (\(\alpha < .0001\)) for each of these three items (see Appendix C: Statistical Tests of IMSA 2061 Themes, page 39).

The second subset of three themes relate to state standards, assessments, and local/district curriculum (Figure 4). Participants report more understanding of the “Illinois” and district themes coming in to the workshop than had been reported for the Project 2061 themes (Figure 3). Distributions suggest a slightly positive pre/post shift for the first two items, and a negative shift for the third (Figure 10, page 29). Likewise, responses to the second item are considerably more dispersed on the post-workshop questionnaire. It is possible that some participants are recognizing implications of the tools for local needs. However, the paired t-tests for each of these items indicate that differences between pre- and post-workshop means are not statistically significant (\(\alpha = .05\)). Given the strong gains on the “Project 2061 Themes” and the lack of gains for the “Illinois Themes,” it might be worth considering whether local concerns should be addressed more explicitly (as are the Project 2061 tools) in the introductory workshop.

**Figure 4: Participants’ Familiarity with Local Themes: Pre/Post Comparison**

<table>
<thead>
<tr>
<th>I have a strong understanding of…</th>
<th>N</th>
<th>Mean</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>…the Illinois Learning Standards for Science</td>
<td>89</td>
<td>3.20</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… the Illinois Standards Achievement Test (ISAT) or Prairie State Achievement Exam (PSAE)</td>
<td>88</td>
<td>2.83</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>… local school/district curriculum</td>
<td>92</td>
<td>3.40</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.27</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>2.93</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>3.29</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: Bars indicate paired item means and standard errors.

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\(^5\)
IMSA 2061 COHORT PROGRAMS

ABOUT THE COHORT PROGRAMS

FORMATION OF COHORT GROUPS

Two of the teams represented at the May 1-2, 2001, Introductory Workshop became the first cohorts for IMSA 2061 (Crete Monee C.U.S.D. 201U and five districts from the WSCAE). A second group from the WSCAE is in the process of forming a cohort that will begin work during the coming school year. Additionally, the other group of districts for whom IMSA 2061 conducted an Introductory Workshop has asked to begin cohort work in August 2002. Quincy Public School District 172 is beginning work as a cohort in June 2002. They had contracted with Project 2061 for a workshop for high school science teachers in August 2000. They were impressed with the philosophy and tools of Project 2061. After several discussions with the Assistant Superintendent for Curriculum and a group of teachers from all grade levels, K-12, they decided that forming a cohort with IMSA 2061 would help them improve science education in their district.

DEVELOPMENT OF DATABASE UTILITY

During the course of the work this year, it became clear that the correlation between Project 2061’s Benchmarks and the Illinois Learning Standards (ILS) as well as the National Science Education Standards (NSES) was critical for the districts with which we were working. It also became clear that a relatively easy, efficient, and flexible manner of storing, retrieving, sorting, and displaying the information teachers were developing was critical. A variety of formats to serve the needs of teachers, administrators, and school boards was desirable.

In order to meet these two needs a FileMaker Pro™ database was developed and continues to be developed. The database automatically displays related ILS and NSES when a benchmark is selected. The work to build the file making the correlations with ILS is still underway. Additionally, teachers input data from their readings, about adult literacy, instructional implications, and common student misconceptions for each section of Benchmarks for Science Literacy. They also include information about the meaning and level of sophistication of each benchmark, their justification for grade placement, the unit in which the benchmark will be taught and assessed, and other relevant information. Layouts available include or will include those that show the flow of benchmarks within a given area throughout the curriculum (from grade to grade), benchmarks with supporting documentation for each grade level, and benchmarks arranged by the units in which they are to be learned by students and after which they will be assessed.
Cohort Program Meetings Evaluation

The results of the overall evaluation of the Cohort meetings are very similar to the results found for the Introductory Workshops (Figure 1, page 9). The distributions are firmly in the positive end of the Likert-Type scale, with only a few outliers, some of which may be participant error in interpreting the scales. As was seen in the previous results for the Introductory Workshops, the presenters’ “education and experience in the subject matter” shows the highest rating of the items. (See also: Figure 12: Cohort Programs ISBE Likert-Type Items by Session Date, page 31.)

Figure 5: ISBE Form 77-21 Likert-Type Items for Cohort Programs

<table>
<thead>
<tr>
<th>Item</th>
<th>N6</th>
<th>Std. Dev.</th>
<th>Mean</th>
<th>Strongly Disagree</th>
<th>Somewhat Disagree</th>
<th>No Opinion</th>
<th>Somewhat Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>The activity increased my knowledge and skills in my areas of certification, endorsement or teaching assignment.</td>
<td>224</td>
<td>0.9217</td>
<td>4.4509</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The relevance of this activity to ISBE teaching standards was clear.</td>
<td>224</td>
<td>0.9034</td>
<td>4.5000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>It was clear that the activity was presented by persons with education and experience in the subject matter.</td>
<td>222</td>
<td>0.8369</td>
<td>4.6982</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The material was presented in an organized, easily understood manner.</td>
<td>223</td>
<td>0.9271</td>
<td>4.4350</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>The activity included discussion, critique, or application of what was presented, observed, learned, or demonstrated.</td>
<td>222</td>
<td>0.8946</td>
<td>4.5541</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

This chart represents participants’ overall satisfaction with IMSA 2061 sessions. Content at sessions vary and in the Cohort program participants respond for each session attended.
ACTIVE COHORT: CRETE MONEE C.U.S.D. 201U

After a presentation by Bob Brazzle on science professional development in the fall of 2000, Crete Monee sent a team of teachers, an administrator, and a staff member from the district office who is in charge of quality initiatives for the district to the May 2001 Introductory Workshop. The team was extremely enthusiastic and expressed interest in continuing work. They explained that they had no science curriculum in grades K-6; teachers were allowed to teach what they wanted and thought would be of interest to their students. A grant writer for the district who attended a portion of the workshop was clearly impressed and had already written a Scientific Literacy Grant to fund a long-term cohort with IMSA 2061. He was determined to fund the work whether or not that particular grant was funded. Indeed, the grant was not funded, but the district was able to use other grant money to begin the cohort.

The Curriculum Director in the district was proactive in advocating for change in the district. This strong leadership was critical in the development of the cohort. He ensured that administrators in each school provided committee members with time to work on this project. He also assured committee members that administrative and financial support would be provided for changes they suggested. Over the course of the year he assured them that he would support them in leading the professional development and dissemination plan for other teachers in the district. This support was critical as teachers did not want to commit to work without some assurance that curriculum would change based on their work and that they would not be put in the position of telling other teachers (who might be resistant) that they must teach different topics or in a different way.

At the initial two-day professional development workshop in September 2001, the entire science faculty was introduced to Project 2061 publications and allowed to explore some of the uses of these tools. The team of teachers and administrators that form the cohort also set goals for their work in developing curriculum and improving instructional practice. The team consists of one teacher from each grade level from kindergarten through eighth grade, three teachers from the high school (one biology teacher, one earth science and chemistry teacher, and one physics teacher), an administrator, and the staff person in charge of quality programs. Each of the schools in the district has at least one representative on the committee.

The team has met and studied the Project 2061 benchmarks, assigned them to the grade in which they will be taught, and engaged in model lessons designed to help students overcome common misconceptions about basic science concepts. These meetings have occurred approximately monthly during the school year. The team studied chapters 4, 5, and 10 from *Benchmarks for Science Literacy* and determined which portions of chapters 3, 6, and 8 they wanted to include in their science curriculum (as opposed to their social studies, health, or other subject area curriculum). They then placed these benchmarks into units within grades and began to determine where the benchmarks from chapters 1, 11, and 12 would be introduced, assessed, and used. The final meeting of the school year was a two-day meeting in June during which teachers selected materials for units they plan to pilot during the 2002-2003 school year. A three-day workshop is planned for August to help teachers delve into the scientific content and develop instructional methods for the units they will pilot.
Cohort teams are expected to represent the core leadership for the school district. For this reason, it is especially important that members of the cohort participate in each meeting. The Crete-Monee Cohort has 12 members on its leadership team. Participation for each meeting is indicated by the count of returned ISBE Form 77-21 workshop evaluation forms. With the exception of the January session, this count for the cohort has been 10 to 12 participants.

Participant registration information was used to illustrate how well participants represent the school units, demographic characteristics, and teaching/administration functions of the district. The cohort leadership team is distributed, if thinly, among the districts’ schools and represent all grade levels. The team is composed almost entirely of white female teachers, with one male and one administrator serving on this team. It will be worth considering whether the cohort team is sufficiently representative of the district to provide the “critical mass” required to fully implement the curricular reforms that they develop. Consideration of the demographic and performance characteristics of each school (below) will aid in making this determination.

One of the most significant challenges faced by the Crete-Monee district is reflected in its demographics. Children are in neighborhood elementary schools through grade four, whereupon they enter a common Intermediate Center. There is also one Middle School and one High School for this district. Prior to entering the Intermediate Center, however, the demographic and achievement indicators for the feeder elementary schools vary greatly. Children enter the Intermediate Center with very diverse experiences of elementary schooling.

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7 Refer to Table 5 in the appendices, page 32.
8 See Table 6 in the appendices, page 32.
9 See appendix Table 7 and Table 8, page 32.
10 Demographic and school performance distributions are provided in the appendix beginning on page 33.
ACTIVE COHORT: WEST SUBURBAN CONSORTIUM FOR ACADEMIC EXCELLENCE (WSCAE)

A superintendent from a relatively new consortium of elementary schools in western Cook County, the West Suburban Consortium for Academic Excellence (WSCAE), contacted the Director of the Center@IMSA to ask about professional development IMSA offers in the area of science. Membership in this consortium is limited to elementary school districts which are recipients of SchoolSearch’s Bright Red Apple Award for their outstanding educational environment. The designation is based on academic performance, pupil/teacher ratio, expenditure per child, educational level of the teachers, and average teacher salary. The consortium has five primary areas of focus: science education, gifted student programs, technology, job-alike groups, and staff development. As a result of that conversation, four superintendents from the consortium and a representative from the West 40 Intermediate Service Provider with whom they work attended the May 1-2, 2001, Introductory Workshop.

The superintendents were impressed both with the Project 2061 publications and with the IMSA 2061 personnel. They asked numerous questions about the ways in which the tools could be used to build coherence into their curricula and evaluate materials they use or may want to adopt for use in their science curricula.

A leadership team from IMSA then presented an overview of our vision of cohort work to the WSCAE Science Sub-Committee. The consortium leaders were interested in pursuing work with IMSA 2061 but agreed that not all districts were ready to take on this work. They asked us to conduct an Introductory Workshop for teams from all of the districts so that they had enough information to make a decision about whether they wanted to become part of a cohort group in the 2001-2002 school year, the 2002-2003 school year, or some time after that. This workshop took place in June 2001. We also conducted a three-hour session as a part of WSCAE’s in-service day in October 2001. As a result of these activities, a cohort group of five districts was developed.

As with the Crete Monee cohort, strong leadership was critical in the formation of this cohort. The co-chairs of the WSCAE Science Sub-Committee maintained contact with other superintendents and set deadlines for them to make decisions about taking part in the first cohort group. They also encouraged other superintendents and kept contact with IMSA to answer other superintendents’ questions. These superintendents are also actively recruiting other districts to join a second WSCAE cohort to begin in the 2002-2003 school year.

The cohort group consists of teams from five districts.11 There are, in total, 34 registered members.12 Each of these teams includes classroom teachers and an administrator or district science specialist.13 The entire cohort spent one day assessing the needs assessment forms they had completed as districts. IMSA 2061 aided in facilitating this day and in identifying common

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11 Representation by school is provided in the appendices. See Table 10 on page 34.
12 For session participation counts, see Cohort Program: WSCAE on page 34.
13 See Table 12, page 34.
needs across the group. At the initial two-day professional development workshop in January 2002, the team looked at the Project 2061 materials analysis procedure. They learned to use this procedure by practicing on some lessons from *Chemistry that Applies*. They then used the procedure to begin to analyze the content and instructional practice in a unit they currently teach. This analysis helped teachers, who had previously attended an Introductory Workshop, begin deeper study of the Project 2061 tools. The teams of teachers and administrators that form the cohort also set goals for their work in building coherence into their science curriculum and improving instructional practice. These goals included sharing of ideas for lessons, units, and materials that teachers in one district find particularly effective with the teachers in other districts. Each team also began to discuss how these goals fit into the specific goals for its district.

Throughout the spring, the team has met and studied the Project 2061 benchmarks, assigned them to the grade in which they are or will be taught, looked for places to include benchmarks not currently taught, began to determine where redundancies could be eliminated, engaged in model lessons designed to help students overcome common misconceptions about basic science concepts, and engaged in discussions on assessment of student learning in science. These meetings have occurred approximately monthly. The teams studied chapters 4 and 5 from *Benchmarks for Science Literacy*, and some began to determine which portions of chapters 3, 6, and 8 they wanted to include in their science curriculum (as opposed to their social studies, health, or other subject area curriculum). The final meeting of the school year was a two-day meeting in June during which teachers continued to study the benchmarks and planned their work for the 2002-2003 school year. A three-day workshop is planned for August to continue sharing of lessons between districts and to begin to group benchmarks into units that can be modified from those currently taught. We will also begin to discuss selection of materials as appropriate.
POTENTIAL COHORTS

FRANKFORT/LINCOLN WAY

Frankfort Community Consolidated School District was a member of the First in the World Consortium (FITW). Teachers from the school district took part in a workshop conducted by Project 2061 during the summer of 2000. IMSA drafted a proposal to work with school districts that were part of FITW beginning in the 2001-2002 school year. The superintendent of Frankfort Schools was interested in taking part in the cohort. Since no other districts expressed interest and Frankfort was interested in working with Lincoln Way East High School, the district into which they feed but that was not a FITW member, she decided to approach IMSA separately.

IMSA 2061 personnel conducted an Introductory Workshop for teachers and administrators from these two districts in August 2001. Everyone at the workshop found the Project 2061 publications extremely helpful. The teachers at the high school were particularly interested but felt that a cohort would only be valuable if it included at least three of their five feeder districts. The other feeder districts had not shown any interest in attending the initial workshop, but everyone thought that the support of the high school might provide the incentive for them to reconsider. Indeed, two other districts have expressed interest in joining the cohort and attended the Introductory Workshop held through the ROEs in April. It appears that this cohort will begin in the fall.

MECCA

During the 2000-2001 school year, the Metro East Consortium for Child Advocacy (MECCA) helped identify teachers in the St. Louis area to perform action research within IMSA's National Teachers Policy Institute (NTPI) network in Illinois. As a result of that work, several teachers requested information about professional development that IMSA provides in science. IMSA invited representatives from MECCA to attend the May 1-2, 2001, Introductory Workshop to obtain more information about Project 2061 publications and how they could be used in the schools served by MECCA to strengthen their science curricula and instructional practices. A lot of interested was generated, particularly from teachers of grades 6-12. Teachers in grades 1-5 had already received a substantial amount of professional development in the area of science from the Teachers Academy for Mathematics and Science (TAMS). At the request of the Executive Director of MECCA, Linda Brazdil presented information to the MECCA Board of Trustees. The Board was in favor of moving ahead with the proposal. All but one school district in the consortium wanted to form a cohort for teachers in grades 6-12. However, superintendents did not follow through immediately in order to identify teachers interested in becoming members of the cohort team. An Introductory Workshop was finally scheduled for April, but it had to be canceled because teachers were not given enough notice. By this time it was becoming clear that two things were working against the formation of the cohort. The first of these was the poor performance of students in the districts MECCA serves on basic reading and mathematics tests. Superintendents thought that all of their focus should be placed on improving student performance in these areas before beginning an initiative in science. The
second factor dealt with funding. While the funding had been present to form a cohort during the 2001-2002 school year, cuts in the state budget included cuts to MECCA's funding for many projects. Therefore, no cohort began in 2001-2002 and none will begin in the coming school year either. The Executive Director of MECCA remains hopeful that IMSA 2061 will be able to work in long-term professional development with science teachers and administrators from the schools MECCA serves at some point in the future.

**Homewood Flossmoor C.H.S.D. 233, Oak Lawn-Hometown School District 123, Indian Prairie C.U.S.D. 204**

These three school districts attended the May 1-2, 2001 Introductory Workshop but did not form cohort groups. While the workshop participants from Homewood Flossmoor and Oak Lawn found the Project 2061 materials valuable, administrators in their districts thought there were other, less expensive, ways to develop science curricula and improve instructional practice in science. The teachers from Indian Prairie also found the workshop helpful, but they have used Project 2061 materials in the past, are happy with their science curriculum, and think they are capable of using these publications without becoming involved in a long-term cohort.
WHAT WE ARE LEARNING

There are many factors that appear necessary for the successful formation of a cohort team within a district or a consortium. Administrative support and leadership is essential. In a district, this can be the curriculum coordinator, the superintendent, or a department chair. It must be somebody with the ability to provide teachers with the time and money needed to commit to the long-term professional development needed as well as the authority to ensure that changes can and will be implemented as the work progresses. In a consortium, it is important that not only the leadership within the consortium, but also leaders within each of the districts, are committed to IMSA 2061 professional development in order to obtain the support needed to begin the long-term professional development.

In addition to administrative support, teachers within the district or consortium also must recognize the need for changes in their science curriculum. The need for change is not always readily apparent to teachers. They often know that they are teaching too much within the time frame they have for science or that the material they are teaching is beyond the cognitive level of the students. The understanding of how to change, and the level of change needed, is not essential, indeed it is often not present at the beginning of the work. The understanding of the types and extent of change required progresses as the work continues. However, teachers must come with an understanding that change is necessary and a desire to change their practice. Without this, teachers or administrators simply justify their current practice by topically matching it with the Project 2061 benchmarks.

Both teachers and administrators must understand and be committed to long-term professional development and the idea that important scientific concepts and connections should drive the curriculum and instructional practice in science. This is important as teachers begin to study the benchmarks and discuss the ideas of science because they often are used to select materials and activities that are fun and colorful but that may be only topically matched to important scientific concepts. Additionally, good activities may be used without instructional strategies that ensure student understanding of the phenomena they observe. Understanding the goal and being able to draw connections between the various concepts in science is critical for teachers as they develop ways to enhance student understanding of big concepts in science.

The importance to teachers and administrators of correlating Project 2061 Benchmarks with Illinois Learning Standards and, to a lesser extent, National Science Education Standards, became increasingly clear this year. Student accountability for these learning goals is important. This led, as stated above, to the beginning of the development of the database that provides these correlations. Teachers and administrators highly value professional development that helps them learn to use Project 2061 tools to understand state standards and to teach in ways that meet the standards while helping students to see big concepts and the connections between the discreet standards.

As stated above Introductory Workshops were used as a marketing tool for long-term professional development with IMSA in the use of Project 2061 publications to enhance science
curriculum and instructional practice. These workshops, while appearing to be successful in increasing awareness of the Project 2061 publications and the uses of these publications, have not yet fulfilled the promise of bringing districts into long-term professional development. The groups who are forming cohorts are those who were already looking for long-term help. While some of them attended Introductory Workshops, they did so after having approached IMSA for long-term assistance in the area of science. In some cases, as with the Frankfort School District and Quincy Public Schools, they were aware of Project 2061 and its publication and were interested in learning to use them to improve science education in their districts. In other cases, as with Crete Monee C.U.S.D. and WSCAE, they knew of IMSA and that we work with districts over time to improve mathematics and science instruction. They were interested in this type of professional development to improve science education in their districts. In these cases, discussions with IMSA and introduction to the Project 2061 publications led to the decisions to form cohort groups.

Cost is another large issue in determining whether districts form cohort groups with IMSA. Long-term professional development is expensive for school districts because they are paying for approximately ten days of professional development. A number of districts have suggested that costing this out as a package that describes the data base, the professional development, and the support provided in addition to specific professional development days would help them in being able to justify the costs to their school boards or to external funders. Additionally, the idea of districts with similar interests or a high school district along with its feeder districts joining together helps both to broaden the conversation and to lessen the overall cost for each district. This can be important, particularly for small districts and districts in rural or urban areas.

Working with consortia or other groups of districts brings unique challenges that are not encountered when working with one district. While the cohort group sets specific goals for the work to be accomplished, each district has its own strengths and weaknesses, is in a different place within its curriculum review and/or textbook adoption process, and has specific needs which are not shared by the entire consortium. Much of this is easily accommodated during the professional development sessions while districts are working as groups. However, several districts have asked for additional professional development days to address their specific needs. This has been valuable for the districts and is something that should be considered early in the formation of cohort groups that involve more than one district.
SELECTED REFERENCES


Project 2061 (American Association for the Advancement of Science) (1999). Dialogue on early childhood science, mathematics, and technology education. Washington DC, American Association for the Advancement of Science/Project 2061.


### APPENDIXES

<table>
<thead>
<tr>
<th>Appendix A: Sample Agenda for a 2-Day Session</th>
<th>26</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appendix B: Analysis of Response Distributions</td>
<td>27</td>
</tr>
<tr>
<td>Introductory Workshops</td>
<td>27</td>
</tr>
<tr>
<td>Cohort Programs</td>
<td>31</td>
</tr>
<tr>
<td>Cohort Program: Crete-Monee</td>
<td>32</td>
</tr>
<tr>
<td>Cohort Program: WSCAE</td>
<td>34</td>
</tr>
<tr>
<td>About Reading Box Plots</td>
<td>37</td>
</tr>
<tr>
<td>Appendix C: Statistical Tests of IMSA 2061 Themes</td>
<td>39</td>
</tr>
<tr>
<td>Appendix D: Instruments</td>
<td>41</td>
</tr>
<tr>
<td>Center@IMSA Program Participant Information Form (Registration)</td>
<td>42</td>
</tr>
<tr>
<td>Initial IMSA 2061 Cohort Needs Assessment</td>
<td>44</td>
</tr>
<tr>
<td>ISBE Form 77-21: “Evaluation and Evidence of Completion...”</td>
<td>45</td>
</tr>
<tr>
<td>Reflections on Day One (Introductory Workshop)</td>
<td>46</td>
</tr>
<tr>
<td>Reflecting on the Introduction to Project 2061 Workshop (Post-Workshop)</td>
<td>48</td>
</tr>
<tr>
<td>Reflecting on the Introduction to Project 2061 Workshop (Pre and Post)</td>
<td>49</td>
</tr>
<tr>
<td>Appendix E: Sample Participant Comments</td>
<td>51</td>
</tr>
<tr>
<td>ISBE Form 77-21</td>
<td>51</td>
</tr>
<tr>
<td>ISBE 77-21: Tools/Resources as a “Best Feature”</td>
<td>51</td>
</tr>
<tr>
<td>ISBE 77-21: Professional Interaction as a “Best Feature”</td>
<td>52</td>
</tr>
<tr>
<td>ISBE 77-21: Relevancy/Utility as a “Best Feature”</td>
<td>53</td>
</tr>
<tr>
<td>ISBE 77-21: “Best Feature” – Presentation Style</td>
<td>54</td>
</tr>
<tr>
<td>ISBE 77-21: “Suggestions for Improvement” – Presentation Style</td>
<td>54</td>
</tr>
<tr>
<td>ISBE 77-21 “Suggestions for Improvement” – Activities/Content</td>
<td>55</td>
</tr>
<tr>
<td>ISBE 77-21 “Comments” – Appreciation</td>
<td>56</td>
</tr>
<tr>
<td>ISBE 77-21 “Comments” – Accommodations</td>
<td>56</td>
</tr>
<tr>
<td>IMSA 2061 Reflections on Day One</td>
<td>57</td>
</tr>
<tr>
<td>Reflections on Day One: Impressions/Insights about the Need for Change</td>
<td>57</td>
</tr>
<tr>
<td>Reflections on Day One: Questions/Concerns about the Need for Change</td>
<td>58</td>
</tr>
<tr>
<td>Reflections on Day One: Impressions/Insights-Tools for Science Literacy</td>
<td>59</td>
</tr>
<tr>
<td>Reflections on Day One: Questions/Concerns-Tools for Science Literacy</td>
<td>60</td>
</tr>
<tr>
<td>Reflections on Day One: Impressions/Insights-Benchmark Study</td>
<td>61</td>
</tr>
<tr>
<td>Reflections on Day One: Questions/Concerns-Benchmark Study</td>
<td>62</td>
</tr>
<tr>
<td>Reflections on Day One: Impressions/Insights-Model Lessons</td>
<td>63</td>
</tr>
<tr>
<td>Reflections on Day One: Questions/Concerns-Model Lessons</td>
<td>64</td>
</tr>
<tr>
<td>Reflections on Day One: Other Thoughts?</td>
<td>65</td>
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APPENDIX A: SAMPLE AGENDA FOR A 2-DAY SESSION

IMSA 2061 Workshop
Quincy School District 172
June 26-27, 2002

Wednesday, June 26, 2002:

9:00–9:40 am  
Introductions/Kick Off  
How do you help students to learn scientific concepts and what are you  
hoping to learn today and through continued professional development with  
IMSA 2061?

9:40–10:20 am  
Need for Change in Science Education

10:20–10:45 am  
Features of the Project, Its History and Tools

10:45–11:30 am  
Benchmark Study Procedure –  
Identification and Clarification of a Learning Goal  
Conduct Study of a Learning Goal  
(Benchmarks 11A(K-2)#1; 11A(3-5)#1; 11A(6-8)#1; 11A(9-12)#1)  
OR Benchmark 4D(6-8)#7

11:30 am – 12:30 pm  
Lunch

12:30–2:00 pm  
Model Lessons from Chemistry that Applies

2:00–2:30 pm  
Analysis of Lessons

2:30–3:15 pm  
Introduction to the Atlas of Science Literacy

3:15–3:30 pm  
Summary/Conclusions of First Day –  
Look forward to Second Day  
Homework Assignment - Read  
Science for All Americans – Chapter 13  
Assigned portions of Chapter 7 from Design for Science Literacy

Thursday, June 27, 2002:

9:00–9:30 am  
Reflections from yesterday’s workshop

9:30–11:00 am  
Benchmark Study and Strand Map Exercise to look at Curriculum Coherence

11:00–11:15 am  
Response to Reflections

11:15–11:30 am  
Introduction to Unburdening the Curriculum

11:30 am – 12:30 pm  
Lunch

12:30–2:00 pm  
Unburdening the Curriculum

2:00–3:00 pm  
Discussion of Needs Assessment

3:00–3:30 pm  
Next Steps  
Individual Reflections
APPENDIX B: ANALYSIS OF RESPONSE DISTRIBUTIONS

See page 37 for tips on reading box plot distributions.

INTRODUCTORY WORKSHOPS

Figure 6: Distributions for ISBE 77-21 Likert-Type Items for Introductory Programs

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Std. Dev.</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>6. The activity increased my knowledge and skills in my areas of certification, endorsement or teaching assignment.</td>
<td>140</td>
<td>1.1099</td>
<td>4.1643</td>
</tr>
<tr>
<td>7. The relevance of this activity to ISBE teaching standards was clear.</td>
<td>141</td>
<td>1.0234</td>
<td>4.3191</td>
</tr>
<tr>
<td>8. It was clear that the activity was presented by persons with education and experience in the subject matter.</td>
<td>142</td>
<td>0.7573</td>
<td>4.7465</td>
</tr>
<tr>
<td>9. The material was presented in an organized, easily understood manner.</td>
<td>142</td>
<td>1.0648</td>
<td>4.1901</td>
</tr>
<tr>
<td>10. The activity included discussion, critique, or application of what was presented, observed, learned, or demonstrated.</td>
<td>141</td>
<td>0.8032</td>
<td>4.5816</td>
</tr>
</tbody>
</table>

Figure 7: Introductory Workshop ISBE Likert-Type Items by Session Date

![Graph showing distributions for ISBE 77-21 Likert-Type Items by Session Date](image-url)
Figure 8: Examples of Potential Outlier Responses to ISBE Form 77-21

<table>
<thead>
<tr>
<th>Comments (three open-ended questions combined)</th>
</tr>
</thead>
<tbody>
<tr>
<td>♦ The well prepared instructors, the available materials, the excellent program for study Location was good and facility was comfortable</td>
</tr>
<tr>
<td>♦ {Presenter} seemed knowledgeable More activities, less lecture/reading and no homework When teaching teachers, make sure to break up and use different teaching strategies. Give them practical things to implement/apply</td>
</tr>
<tr>
<td>♦ Revisiting standards we are to teach. More organized, concise … assume we are as intelligent as we are.</td>
</tr>
<tr>
<td>♦ The books. I'm sure the presenters are knowledgeable in their field, but I had problems connecting with their communication style.</td>
</tr>
<tr>
<td>♦ The step by step process was good, but...the time for activities &amp; Q. &amp; A. should have been much shorter. Presenters seemed to stretch the activities.</td>
</tr>
<tr>
<td>♦ Books. Need to have all materials talked about - organization - very dull</td>
</tr>
<tr>
<td>♦ The step by step process in which it was introduced. Vary your presentation to what the professionals attending need - we could have attained the same info you spoke about by reading the books.</td>
</tr>
<tr>
<td>♦ Lots of examples. Hands on activity. Your program is difficult to combine with state standards. Explain how to do this in an effective, efficient way.</td>
</tr>
<tr>
<td>♦ I love receiving the texts, especially the Atlas of Science Literacy. Make sure you present your presentation appropriately - this does not correlate directly to the state standards. There were no experiments or lessons that help highlight the foundation (K/l) of a scientifically literate grade schooler.</td>
</tr>
</tbody>
</table>
Figure 9: Distributions for Participants’ Familiarity with Project 2061 Themes

I have a strong understanding of…

<table>
<thead>
<tr>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>evidence of the imperative for science literacy (i.e., TIMSS, “Glenn Commission”, etc.)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.300</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>1.031</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.093</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>123</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.929</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.906</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.072</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>157</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>“scientific literacy” as defined by the text Science for All Americans</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>1.972</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.931</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.090</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>106</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.215</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.664</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.052</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>163</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>fundamental grade level learning goals as defined by Benchmarks for Science Literacy</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.282</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.969</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.092</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>110</td>
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<td></td>
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<tr>
<td>Pre</td>
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<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.236</td>
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</tr>
<tr>
<td>Std Dev</td>
<td>0.740</td>
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</tr>
<tr>
<td>Std Err Mean</td>
<td>0.058</td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>165</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Figure 10: Distributions for Participants’ Familiarity with Local Themes

I have a strong understanding of…

<table>
<thead>
<tr>
<th></th>
<th>Strongly Disagree</th>
<th>Disagree</th>
<th>Agree</th>
<th>Strongly Agree</th>
</tr>
</thead>
<tbody>
<tr>
<td>the Illinois Learning Standards for Science</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.111</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.828</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Err Mean</td>
<td>0.077</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>117</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>3.213</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.695</td>
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<td>Std Err Mean</td>
<td>0.055</td>
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<td>Post</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>160</td>
<td></td>
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<td></td>
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<tr>
<td>the Illinois Standards Achievement Test (ISAT) or Prairie State Achievement Exam (PSAE)</td>
<td></td>
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<td></td>
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<td>Mean</td>
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<tr>
<td>Std Dev</td>
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<tr>
<td>Std Err Mean</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Pre</td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>N</td>
<td>116</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Mean</td>
<td>2.897</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Std Dev</td>
<td>0.910</td>
<td></td>
<td></td>
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<tr>
<td>Std Err Mean</td>
<td>0.073</td>
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<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>156</td>
<td></td>
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<tr>
<td>local school/district curriculum</td>
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<td>Mean</td>
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<td></td>
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</tr>
<tr>
<td>Std Dev</td>
<td>0.865</td>
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</tr>
<tr>
<td>N</td>
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<tr>
<td>Mean</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Post</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>N</td>
<td>163</td>
<td></td>
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</tbody>
</table>
**Cohort Programs**

Figure 11: ISBE Form 77-21 Likert-Type Items for Cohort Programs

<table>
<thead>
<tr>
<th>Item</th>
<th>N</th>
<th>Std. Dev.</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>The activity increased my knowledge and skills in my areas of certification, endorsement or teaching assignment.</td>
<td>224</td>
<td>0.9217</td>
<td>4.4509</td>
</tr>
<tr>
<td>The relevance of this activity to ISBE teaching standards was clear.</td>
<td>224</td>
<td>0.9034</td>
<td>4.5000</td>
</tr>
<tr>
<td>It was clear that the activity was presented by persons with education and experience in the subject matter.</td>
<td>222</td>
<td>0.8369</td>
<td>4.6982</td>
</tr>
<tr>
<td>The material was presented in an organized, easily understood manner.</td>
<td>223</td>
<td>0.9271</td>
<td>4.4350</td>
</tr>
<tr>
<td>The activity included discussion, critique, or application of what was presented, observed, learned, or demonstrated.</td>
<td>222</td>
<td>0.8946</td>
<td>4.5541</td>
</tr>
</tbody>
</table>

Figure 12: Cohort Programs ISBE Likert-Type Items by Session Date
### Table 5: Crete-Monee Cohort Participation by Session Date

<table>
<thead>
<tr>
<th>Session Date</th>
<th>Notes</th>
<th>Count</th>
</tr>
</thead>
<tbody>
<tr>
<td>9/24/01</td>
<td>Cohort Meeting</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>&quot;</td>
<td>Non-Cohort Participants</td>
</tr>
<tr>
<td>10/24/01</td>
<td>Cohort Meeting</td>
<td>10</td>
</tr>
<tr>
<td>11/28/01</td>
<td>Cohort Meeting</td>
<td>12</td>
</tr>
<tr>
<td>1/30/02</td>
<td>Cohort Meeting</td>
<td>8</td>
</tr>
<tr>
<td>2/27/02</td>
<td>Cohort Meeting</td>
<td>12</td>
</tr>
<tr>
<td>3/20/02</td>
<td>Cohort Meeting</td>
<td>10</td>
</tr>
<tr>
<td>5/1/02</td>
<td>Cohort Meeting</td>
<td>12</td>
</tr>
<tr>
<td>6/6/02</td>
<td>Cohort Meeting</td>
<td>10</td>
</tr>
</tbody>
</table>

### Table 6: Participation in the Crete-Monee Cohort by School

<table>
<thead>
<tr>
<th>School</th>
<th>City</th>
<th>Registrations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crete Elementary School</td>
<td>Crete</td>
<td>1</td>
</tr>
<tr>
<td>Crete-Monee Community Unit School District 201U</td>
<td>Crete</td>
<td>1</td>
</tr>
<tr>
<td>Crete-Monee Education Center</td>
<td>Crete</td>
<td>1</td>
</tr>
<tr>
<td>Crete-Monee High School</td>
<td>Crete</td>
<td>4</td>
</tr>
<tr>
<td>Crete-Monee Intermediate Center</td>
<td>Crete</td>
<td>2</td>
</tr>
<tr>
<td>Crete-Monee Middle School</td>
<td>University Park</td>
<td>3</td>
</tr>
<tr>
<td>Hickory Elementary School</td>
<td>University Park</td>
<td>1</td>
</tr>
<tr>
<td>Monee Elementary School</td>
<td>Monee</td>
<td>1</td>
</tr>
<tr>
<td>Talala Elementary School</td>
<td>Park Forest</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>

### Table 7: Crete-Monee Cohort Participant Race and Gender Distribution

<table>
<thead>
<tr>
<th>Race</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>White (not Hispanic or Latino)</td>
<td>12</td>
<td>1</td>
<td>13</td>
</tr>
<tr>
<td>(blank)</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>13</td>
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<td>14</td>
</tr>
</tbody>
</table>

### Table 8: Crete-Monee Cohort Participants’ Professional Roles

<table>
<thead>
<tr>
<th>Primary Role</th>
<th>Registrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>1</td>
</tr>
<tr>
<td>Teacher</td>
<td>12</td>
</tr>
<tr>
<td>Other</td>
<td>2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>15</strong></td>
</tr>
</tbody>
</table>
Figure 13: Ethnic Composition of Crete-Monee CU201U Schools, District, and State

<table>
<thead>
<tr>
<th>School</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
<th>Native American</th>
</tr>
</thead>
<tbody>
<tr>
<td>Crete-Monee High</td>
<td>50.3</td>
<td>42.2</td>
<td></td>
<td></td>
<td>4.7</td>
</tr>
<tr>
<td>Crete-Monee Middle</td>
<td>44.8</td>
<td>50.5</td>
<td></td>
<td></td>
<td>3.3</td>
</tr>
<tr>
<td>Crete Monee Intermediate Ctr.</td>
<td>45.7</td>
<td>50.6</td>
<td></td>
<td></td>
<td>3.7</td>
</tr>
<tr>
<td>Talala Elementary</td>
<td>33.7</td>
<td>60.9</td>
<td></td>
<td></td>
<td>4.1</td>
</tr>
<tr>
<td>Monee Elementary</td>
<td>74.1</td>
<td>13.5</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hickory Elementary</td>
<td>24.2</td>
<td>74.1</td>
<td>3.8</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Governors State Univ. Charter</td>
<td>24.2</td>
<td>74.1</td>
<td>3.8</td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Crete Elementary</td>
<td>46.6</td>
<td>48.8</td>
<td></td>
<td></td>
<td>3.8</td>
</tr>
<tr>
<td>Crete Monee CU201U</td>
<td>60.1</td>
<td>39.9</td>
<td></td>
<td></td>
<td>15.4</td>
</tr>
<tr>
<td>State</td>
<td></td>
<td>60.1</td>
<td></td>
<td></td>
<td>39.9</td>
</tr>
</tbody>
</table>

Note: Categories are rank ordered as shown in the key. In general, categories with less than 3% representation (i.e., Asians at Crete-Monee High) are drawn in the chart without value labels, as this would be difficult to read.


Figure 14: Key Indicators for Crete-Monee Cohort Schools

### Table 9: WSCAE Participation by Session Date

<table>
<thead>
<tr>
<th>Date</th>
<th>Location</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>11/30/01</td>
<td>Riverside, IL</td>
<td>22</td>
</tr>
<tr>
<td>2/25/02</td>
<td>Riverside, IL</td>
<td>33</td>
</tr>
<tr>
<td>3/15/02</td>
<td>IMSA</td>
<td>28</td>
</tr>
<tr>
<td>5/14/02</td>
<td>Riverside, IL</td>
<td>28</td>
</tr>
<tr>
<td>6/10/02</td>
<td>Harwood Heights, IL</td>
<td>20</td>
</tr>
</tbody>
</table>

*Source:* Returned ISBE Form 77-21 workshop evaluation forms.

### Table 10: WSCAE Cohort Districts and Schools Represented

<table>
<thead>
<tr>
<th>District</th>
<th>School</th>
<th>City</th>
<th>Registration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gower School Dist 62</td>
<td>Gower Middle School</td>
<td>Burr Ridge</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Gower West Elementary School</td>
<td>Willowbrook</td>
<td>3</td>
</tr>
<tr>
<td>La Grange School Dist 102</td>
<td>Congress Park School</td>
<td>Brookfield</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Forest Road School</td>
<td>La Grange Park</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>La Grange School District 102</td>
<td>La Grange Park</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Park Jr High School</td>
<td>La Grange Park</td>
<td>2</td>
</tr>
<tr>
<td>River Forest School Dist 90</td>
<td>Roosevelt School</td>
<td>River Forest</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Willard Elementary School</td>
<td>River Forest</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Lincoln School</td>
<td>River Forest</td>
<td>3</td>
</tr>
<tr>
<td>Riverside School Dist 96</td>
<td>A F Ames Elementary School</td>
<td>Riverside</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Blythe Park Elementary School</td>
<td>Riverside</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Central Elementary School</td>
<td>Riverside</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Hollywood Elementary School</td>
<td>Brookfield</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>L J Hauser Junior High School</td>
<td>Riverside</td>
<td>2</td>
</tr>
<tr>
<td>Union Ridge School Dist 86</td>
<td>Union Ridge Elementary School</td>
<td>Harwood Heights</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td></td>
<td><strong>34</strong></td>
</tr>
</tbody>
</table>

### Table 11: WSCAE Cohort Participant Race and Gender Distribution

<table>
<thead>
<tr>
<th>Race</th>
<th>Female</th>
<th>Male</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hispanic or Latino</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>White (not Hispanic or Latino)</td>
<td>21</td>
<td>7</td>
<td>28</td>
</tr>
<tr>
<td>(blank)</td>
<td>4</td>
<td>1</td>
<td>5</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>26</td>
<td>8</td>
<td>34</td>
</tr>
</tbody>
</table>

### Table 12: WSCAE Cohort Participants’ Professional Roles

<table>
<thead>
<tr>
<th>Primary Role</th>
<th>Registrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Administrator</td>
<td>1</td>
</tr>
<tr>
<td>Teacher</td>
<td>27</td>
</tr>
<tr>
<td>Other</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>32</strong></td>
</tr>
</tbody>
</table>
Figure 15: Ethnic Composition of WSCAE Schools and State

<table>
<thead>
<tr>
<th>District</th>
<th>School Name</th>
<th>White</th>
<th>Black</th>
<th>Hispanic</th>
<th>Asian</th>
<th>Native American</th>
</tr>
</thead>
<tbody>
<tr>
<td>062</td>
<td>Gower West Elem</td>
<td>75.4</td>
<td>3.8</td>
<td>5.3</td>
<td>15.5</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Gower Middle</td>
<td>75.6</td>
<td>4.3</td>
<td>17.8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Congress Park Elem</td>
<td>61.0</td>
<td>8.4</td>
<td>13.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Cossitt Ave Elem</td>
<td>86.4</td>
<td>3.8</td>
<td>3.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Forest Road Elem</td>
<td>80.7</td>
<td>8.4</td>
<td>8.8</td>
<td></td>
<td></td>
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<td>102</td>
<td>Ogden Ave Elem</td>
<td>94.7</td>
<td>3.0</td>
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<td>102</td>
<td>Park Junior High</td>
<td>84.6</td>
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<td>Lincoln Elem</td>
<td>86.1</td>
<td>4.9</td>
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<td></td>
</tr>
<tr>
<td>090</td>
<td>Willard Elem</td>
<td>85.3</td>
<td>7.2</td>
<td>4.4</td>
<td>3.1</td>
<td></td>
</tr>
<tr>
<td>102</td>
<td>Roosevelt Jr High</td>
<td>85.6</td>
<td>6.0</td>
<td>4.6</td>
<td>2.8</td>
<td></td>
</tr>
<tr>
<td>096</td>
<td>A F Ames Elem</td>
<td>85.2</td>
<td>12.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>096</td>
<td>Blythe Park Elem</td>
<td>91.1</td>
<td>4.2</td>
<td>4.2</td>
<td></td>
<td></td>
</tr>
<tr>
<td>096</td>
<td>Central Elem</td>
<td>86.1</td>
<td>5.6</td>
<td>6.9</td>
<td></td>
<td></td>
</tr>
<tr>
<td>096</td>
<td>Hollywood Elem</td>
<td>95.3</td>
<td>4.7</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>090</td>
<td>L J Hauser Jr High</td>
<td>92.4</td>
<td>4.5</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>098</td>
<td>Union Ridge Elem</td>
<td>90.3</td>
<td>5.2</td>
<td>4.3</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>STATE</td>
<td>60.1</td>
<td>20.9</td>
<td>15.4</td>
<td>3.4</td>
<td></td>
</tr>
</tbody>
</table>

Note: Categories are rank ordered as shown in the key. In general, categories with less than 3% representation (i.e., Asians at Congress Park Elem.) are drawn in the chart without value labels, as this would be difficult to read.

Figure 16: Key Indicators for WSCAE Cohort Schools

Descriptive statistics for Likert-Type (4 or 5-point scale) items are provided throughout this report to identify characteristics of participants’ self-report perspectives. In addition, box plots are displayed in order to efficiently represent the distributions of responses. Box plots show graphically the central tendency (i.e., mean and median) of responses, the dispersion (i.e., ranges and standard deviation), including possible outlier cases. This “picture” of the data can reveal patterns that are not so apparent in the descriptive statistics. Box plots are particularly useful during exploratory work – as in the first year’s implementation of IMSA 2061 – where suitable well-defined and stable longitudinal indicators are yet to be developed.

The following illustration identifies the features of box plots. The bullet points below the figure provide some explanation of these features and how they are useful.

- The top and bottom “points” of the means diamond indicate the location of the calculated average score, the mean.
- The left and right points of the diamond indicate the standard error of the mean. The statistical probability is 95% that the actual mean for a population of participants would fall between these points.
- The box contains the range of scores within the 25th and 75th quartiles.
- The vertical line that divides the box is the median. Half of the responses fall to each side of this line.
- The shortest half bracket indicates the densest 50% of observations. This is useful for visualizing shifts of the group to a new “place” on the scale.
- The ends of the whiskers, denoted A and B, are the outermost data points that fall within the distance computed as 1.5 times the interquartile range. Possible outliers are indicated as points found beyond the whiskers.
APPENDIX C: STATISTICAL TESTS OF IMSA 2061 THEMES

♦ I have a strong understanding of evidence of the imperative for science literacy (i.e., TIMSS, “Glenn Commission”, etc.)

| Mean (Post) | 2.84783 | t-Ratio | 4.796094 |
| Mean (Pre) | 2.33696 | DF | 91 |
| Mean Difference | 0.51087 | Prob > | t | <.0001 |
| Std Error | 0.10652 | Prob > t | <.0001 |
| N | 92 | Prob < t | 1.0000 |
| Correlation | 0.45931 |

♦ I have a strong understanding of “scientific literacy” as defined by the text *Science for All Americans*

| Mean (Post) | 3.24691 | t-Ratio | 11.6619 |
| Mean (Pre) | 1.98765 | DF | 80 |
| Mean Difference | 1.25926 | Prob > | t | <.0001 |
| Std Error | 0.10798 | Prob > t | <.0001 |
| N | 81 | Prob < t | 1.0000 |
| Correlation | 0.31213 |

♦ I have a strong understanding of fundamental grade level learning goals as defined by *Benchmarks for Science Literacy*

| Mean (Post) | 3.22222 | t-Ratio | 7.435058 |
| Mean (Pre) | 2.32099 | DF | 80 |
| Mean Difference | 0.90123 | Prob > | t | <.0001 |
| Std Error | 0.12121 | Prob > t | <.0001 |
| N | 81 | Prob < t | 1.0000 |
| Correlation | 0.15755 |

♦ I have a strong understanding of the Illinois Learning Standards for Science

| Mean (Post) | 3.26966 | t-Ratio | 0.814955 |
| Mean (Pre) | 3.20225 | DF | 88 |
| Mean Difference | 0.06742 | Prob > | t | 0.4173 |
| Std Error | 0.08272 | Prob > t | 0.2086 |
| N | 89 | Prob < t | 0.7914 |
| Correlation | 0.42787 |

♦ I have a strong understanding of the Illinois Standards Achievement Test (ISAT) or Prairie State Achievement Exam (PSAE)

| Mean (Post) | 2.93182 | t-Ratio | 1.174219 |
| Mean (Pre) | 2.82955 | DF | 87 |
| Mean Difference | 0.10227 | Prob > | t | 0.2435 |
| Std Error | 0.0871 | Prob > t | 0.1218 |
| N | 88 | Prob < t | 0.8782 |
| Correlation | 0.60089 |

♦ I have a strong understanding of local school/district curriculum

| Mean (Post) | 3.29348 | t-Ratio | -1.10565 |
| Mean (Pre) | 3.40217 | DF | 91 |
| Mean Difference | -0.1087 | Prob > | t | 0.2718 |
| Std Error | 0.09831 | Prob > t | 0.8641 |
| N | 92 | Prob < t | 0.1359 |
| Correlation | 0.29789 |
### APPENDIX D: INSTRUMENTS

<table>
<thead>
<tr>
<th>Instrument</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Center@IMSA Program Participant Information Form (Registration)</td>
<td>42</td>
</tr>
<tr>
<td>Initial IMSA 2061 Cohort Needs Assessment</td>
<td>44</td>
</tr>
<tr>
<td>ISBE Form 77-21: “Evaluation and Evidence of Completion...”</td>
<td>45</td>
</tr>
<tr>
<td>Reflections on Day One (Introductory Workshop)</td>
<td>46</td>
</tr>
<tr>
<td>Reflecting on the Introduction to Project 2061 Workshop (Post-Workshop)</td>
<td>48</td>
</tr>
<tr>
<td>Reflecting on the Introduction to Project 2061 Workshop (Pre and Post)</td>
<td>49</td>
</tr>
</tbody>
</table>
Program Participant Information

Please print with care. Thanks!

Date (MM/DD/YY)

Program Name

First Name

Initial

Last Name

School Name

School City

School Zip Code

Demographic information is used to determine patterns of participation in our programs and events. The purpose is to evaluate how well we are serving citizens throughout Illinois and also to comply with requirements of funding agencies. Thank you for your cooperation!

What is your primary role?

- Student
- Teacher
- Administrator
- Tech Coordinator
- Library Resource
- Business/Industry
- Other

Grade level(s) served in this role:

- K
- 1
- 2
- 3
- 4
- 5
- 6
- 7
- 8
- 9
- 10
- 11
- 12
- N/A

- Postsecondary (13-16)
- Postgraduate (17+)
- Professional Development

Including this one, how many years have you been in your current role at this school? [ ]

Including this one, how many years have you been in this profession? [ ]

Please indicate how you describe yourself:

- Male
- Female
- Black or African American
- Hispanic or Latino
- American Indian or Alaska Native
- White (not Hispanic or Latino)
- Native Hawaiian or Other Pacific Islander
- Asian

Would you like to be on the Center’s mailing list? [ ] Yes! [ ] No Thanks

Complete the other side of this form if you wish to receive Center@IMSA announcements.*

* The Illinois Mathematics and Science Academy does not sell its mailing lists.

2260572521
Where do you prefer to be contacted?  

School Contact

Number & Street Address

Street Address 2

State  Country  (if other than U.S.A.)

Phone Number  FAX Number

School E-mail Address (e.g., myschoolname@myschool.k12.fl.us)

Home Contact  * Especially helpful for the summer months.

Number & Street Address

Street Address 2

City

State  Zip Code  Country  (if other than U.S.A.)

Phone Number  FAX Number

E-mail Address (e.g., myname@myisp.net)

Subject Area(s)

Check the content areas that describe courses you currently teach (if applicable):

- Algebra I
- Algebra II
- Applied Mathematics
- Art
- Biology or Life Science
- Calculus
- Chemistry
- Computer Science
- Elementary
- Earth Science
- English Language Arts
- Environmental Science
- Foreign Language
- General Mathematics
- General Science
- Geometry
- Gifted Education
- Health
- Home Economics
- Integrated Science
- Interdisciplinary
- Music
- Physical Education
- Physical Science
- Physics
- Pre-Algebra
- Pre-Calculus
- Social Studies
- Special Education
- Trigonometry
- Vocational/Technical
- Other...
IMSA 2061: Discussion Points for Initial Needs Assessment

1. Your current science curriculum, its alignment with Illinois Learning Standards, and the review process or cycle for the science curriculum
   1.1. time for science (length of periods/how often) For HS: courses, enrollment, schedule
   1.2. teaching/mainstreaming/special education/enrollment/% going to college
   1.3. process for alignment/topical/gain size
   1.4. specialists
   1.5. instructional practices
   1.6. connection of text/materials to curriculum
   1.7. how often do they adopt/where are they in the cycle/how do they adopt (who is involved in decision?)
   1.8. how prescriptive or flexible is the curriculum?

2. The leadership structure for science education in your district
   2.1. curriculum director (science/math?), science specialist (role?), lead teachers
   2.2. program level control (who controls policy, budget)
   2.3. who has clout, how much do they have, and why do they have it
   2.4. meetings (how often, purpose, etc.)
   2.5. communications (email, lunch, meetings, etc.)
   2.6. role of union in professional development/school improvement

3. Involvement of stakeholders in science education in your district
   3.1. school board
   3.2. community (parents, parent groups, business and industry, advisory group, universities, teacher educators, professional/science organizations, community centers)
   3.3. direct vs. indirect
   3.4. (teachers/students)

4. Resources used for science education in your district
   4.1. textbooks/other materials (how used)
   4.2. professional journals/associations (coordinated efforts to have resources from these places?)
   4.3. facilities
   4.4. external resources (museums, speakers, other activities)

5. Professional development in science or another area that impacted your science program
   5.1. long term
   5.2. evidence for use in classroom
   5.3. system (who goes?, when?, how decided?)
   5.4. funding
   5.5. nature of training method used?

6. District level assessments used to assess student achievement in science and your science program
   6.1. how derived
   6.2. how used (impact?)

7. District capacity to analyze and use assessment data to support school improvement efforts
   7.1. where does it reside/with whom?
   7.2. technical expertise (analytical, statistical, etc.)
   7.3. absolutes vs. gains
   7.4. longitudinal data
   7.5. how is science program assessed
   7.6. ability to deliver data/database capacity

8. Other reform efforts in which your school is involved, including your school improvement plan

9. District policies, procedures, or practices of which we should be aware because they may impact decisions about the content or delivery of professional development within the cohort
   9.1. professional development scheduling issues
   9.2. technology support
   9.3. learning community/inquiry groups/reading or study groups
   9.4. procedures for sustainability - administrative person
   9.5. stability (attrition rate)
ILLINOIS STATE BOARD OF EDUCATION
Certificate Renewal
100 North First Street
Springfield, Illinois 62777-0001

EVALUATION AND EVIDENCE OF COMPLETION FOR WORKSHOP, CONFERENCE, SEMINAR, ETC.

DIRECTIONS: Please complete and return this form to the presenters of the professional development activity.

<table>
<thead>
<tr>
<th>TITLE OF PROFESSIONAL DEVELOPMENT ACTIVITY</th>
<th>DATE</th>
</tr>
</thead>
</table>

LOCATION (Facility, City, State)

NAME OF PROVIDER

Please answer the following questions by marking the scale according to your perceptions of this professional development activity.

<table>
<thead>
<tr>
<th>1. This activity increased my knowledge and skills in my areas of certification, endorsement or teaching assignment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>2. The relevance of this activity to ISBE teaching standards was clear.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3. It was clear that the activity was presented by persons with education and experience in the subject matter.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>4. The material was presented in an organized, easily understood manner.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>5. This activity included discussion, critique, or application of what was presented, observed, learned, or demonstrated.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agree</td>
</tr>
</tbody>
</table>

The best features of this activity were:

Suggestions for improvement include:

Other comments and reactions I wish to offer:

(TOB E RETAINED BY PROVIDER FOR AT LEAST THREE YEARS)
Please share your thoughts about each of the four themes of the day. (Complete both sides of this document.)

<table>
<thead>
<tr>
<th>INSIGHTS &amp; DISCOVERIES</th>
<th>QUESTIONS &amp; CONCERNS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Need for Change (i.e., Seed and Log)</td>
<td></td>
</tr>
<tr>
<td>Project 2061 Tools for Science Literacy</td>
<td></td>
</tr>
</tbody>
</table>
(Reflections: Side Two)

<table>
<thead>
<tr>
<th>QUESTIONS &amp; CONCERNS</th>
<th>Benchmark Study</th>
<th>Model Lessons</th>
<th>Other thoughts about the day?</th>
</tr>
</thead>
<tbody>
<tr>
<td>INSIGHTS &amp; DISCOVERIES</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


Reflecting on the Introduction to Project 2061 Workshop

[Name]

Date (MM/DD/YY)

1.a. What is your primary professional role?
   - [ ] Student  [ ] Teacher  [ ] Administrator  [ ] Tech Coordinator  [ ] Library Resources  [ ] Business/Industry  [ ] Other

b. Grade level(s) in this role:
   - [ ] K  [ ] 1  [ ] 2  [ ] 3  [ ] 4  [ ] 5  [ ] 6  [ ] 7  [ ] 8  [ ] 9  [ ] 10  [ ] 11  [ ] 12  [ ] Postsecondary  [ ] N/A

2. What is your assessment of the value of this experience for your work?

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

[ ] Your answers are important!

Day 1

This Experience:
3. favorably met or exceeded my expectations.
4. stimulated my thinking.
5. increased my desire to learn.
6. provided useful information.
7. taught me something new.
8. expanded my understanding of science education.
9. was worth my time and effort.
10. was well organized.

Day 2

Strongly Disagree  Disagree  Agree  Strongly Agree

Strongly Disagree  Disagree  Agree  Strongly Agree

Comments:
________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

________________________________________________________________________

Continue to the other side.

0087627785

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- 48 -
REFLECTING ON THE INTRODUCTION TO PROJECT 2061 WORKSHOP (PRE AND POST)

Indicate the extent to which you believe that you currently understand each of the following aspects of Project 2061.

I have a strong understanding of...

1. evidence of the imperative for scientific literacy (i.e., TIMSS, "Glehn Commission", etc.).
   I chose this response because ____________________

2. "scientific literacy" as defined by the text Science for All Americans.
   I chose this response because ____________________

3. fundamental grade level learning goals as defined by Benchmarks for Science Literacy.
   I chose this response because ____________________

4. the Illinois Learning Standards for science.
   I chose this response because ____________________

5. the Illinois Standards Achievement Test (ISAT) or Prairie State Achievement Exam (PSAE).
   I chose this response because ____________________

6. local school/district curriculum.
   I chose this response because ____________________

Thank you!

9305627788

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APPENDIX E: SAMPLE PARTICIPANT COMMENTS

ISBE FORM 77-21

ISBE 77-21: Tools/Resources as a “Best Feature”

1. Working together in grade level groups to analyze benchmarks and align with curriculum. The reasons we received Science for All Americans, Benchmarks for Science Literacy and Atlas for Science Literacy are very helpful.
2. Becoming acquainted with the books at a practical level. Working with other colleagues on K-8 science. Goal setting for 2 years.
3. The Atlas and collaboration - having 2 presenters is excellent for maintaining focus.
4. The texts that we used were great. There was a lot of time to meet with teams.
5. Using the tools. Working with colleagues - in and out of district.
6. The receipt of the two texts. They will forever be a part of my reference when I am called on to participate in curriculum discussions. The diverse group of professionals that assemble for the meeting. This allowed for a sample of awareness of change in Lake County.
7. The expertise of the presenters. The exposure to & use of available 'tools.'
8. Learn how to use benchmarks and Science for Americans and Atlas. Great to see how my curriculum fits in Benchmarks.
9. It helped us in our ongoing committee work on the science committee. Gave me a better understanding of science benchmarks.
10. The books provided knowledge of how to use them.
11. Lunch was good. Materials will be useful.
13. The well prepared instructors, the available materials, the excellent program for study.
14. Reaffirms that less is better. Presenters knowledgeable/committed. Materials presented were excellent.
15. The presentation by the instructors. The exploration & use of the AAAS manuals.
16. Learning how to do a benchmark study utilizing the tools - Science for All American Benchmark Atlas.
17. Introduction of the "tools" that I was not acquainted with. It was valuable to work with materials in doing Benchmark Studies, etc.
18. Website list and other tools.
19. The materials being presented.
20. Introduction to the 'tools'! I never knew they were available. What a great resource!
22. Presentation on benchmarks.
24. The books available.
25. The books.
27. I love receiving the texts, especially the Atlas of Science Literacy.
29. Understanding of benchmarks.
30. The presentation of "maps" that show the flow of benchmarks.
31. I'm glad to get the benchmarks book and Science for All Americans.
32. The project 2061 tools are the best part!
34. The books!
35. Becoming aware of project 2061. Becoming aware of all the printed materials. Becoming aware of what other districts are accomplishing.
36. Exposure to valuable materials. Expertise of presenters.
37. Receiving benchmarks for different grade levels.
38. 1. Analysis of Project 2061 materials. 2. Discussion of analysis of content and instructional strategies. 3. "Teaching techniques" used in the workshop.
**ISBE 77-21: Professional Interaction as a “Best Feature”**

- Working together in grade level groups to analyze benchmarks and align with curriculum. The reasons we received Science for All Americans, Benchmarks for Science Literacy and Atlas for Science Literacy are very helpful.
- Becoming acquainted with the books at a practical level. Working with other colleagues on K-8 science. Goal setting for 2 years
- The Atlas and collaboration - having 2 presenters is excellent for maintaining focus.
- The texts that we used were great. There was a lot of time to meet with teams.
- Using the tools. Working with colleagues - in and out of district.
- The receipt of the two texts. They will forever be a part of my reference when I am called on to participate in curriculum discussions. The diverse group of professionals that assemble for the meeting. This allowed for a sample of awareness of change in Lake County.
- 1. Companionship, sharing ideas, pursuing on Science curriculum.
- 1) Introduction to Benchmarks for grade levels throughout the district. 2) Small group work and discussion with educators from other districts. 3) Participation in model lessons.
- Sufficient time in diverse group. Looking at our own curriculum sharing and practical usable information
- It is giving our district an opportunity to better our science program and help to "educate" others in our district. I also met people from other districts.
- Materials Talking to contact people. Activities
- It opened my eyes to not just accepting my science curriculum. It has made me want to talk to other teachers at different grade levels in my district. I am so glad to find Science for all Americans!
- The materials Working through lessons together at various levels
- Moved along - organized - good group of people.
- The interaction of other professionals is always very useful.
- Discussions w/other teachers, administrators, and IMSA staff.
- Collaboration with colleagues.
- The Opportunities to share with colleagues across my district
- Collaborating with other teachers from other schools
- Hearing what teachers of other districts are doing
- Working with colleagues (both from my district and others)
- Conversation. Time to work with team.
- The opportunity to work with colleagues from my district science committee.
- group discussions.
- Being able to interact with teachers at different districts.
- Other participants - shared their knowledge and resources.
- Collaboration w/others
- Discussions w/other staff
- Some discussions were interesting, especially involving the ISATS & how they related to the benchmarks.
- Collaboration between districts and within team. Lots of ideas - "a summers worth."
- Opening and exchanging of ideas
- Interaction with so many teachers with great ideas. The instructors were very knowledgeable
- Day II allowed time to review benchmarks. Dialogue with Dist. Colleagues very beneficial
- Meeting with other districts to discuss how benchmarks do or do not fit curriculum. Getting more guidelines in working with the books
- The practice in each topic & ability to share ideas.
- Getting instruction on how to effectively use the benchmarks & standards. The exchange it was good to hear from districts who are actively/consistently using the national benchmarks/standards.
ISBE 77-21: Relevancy/Utility as a “Best Feature”

- Working together in grade level groups to analyze benchmarks and align with curriculum. The reasons we received Science for All Americans, Benchmarks for Science Literacy and Atlas for Science Literacy are very helpful.
- Becoming acquainted with the books at a practical level. Working with other colleagues on K-8 science. Goal setting for 2 years
- 1. Companionship, sharing ideas, pursuing on Science curriculum.
- 1) Introduction to Benchmarks for grade levels throughout the district. 2) Small group work and discussion with educators from other districts. 3) Participation in model lessons.
- Sufficient time in diverse group. Looking at our own curriculum
- Sharing and practical usable information
- It is giving our district an opportunity to better our science program and help to "educate" others in our district. I also met people from other districts.
- The expertise of the presenters. The exposure to & use of available 'tools.'
- Learn how to use benchmarks and Science for Americans and Atlas. Great to see how my curriculum fits in Benchmarks
- It helped us in our on-going committee work on the science committee. Gave me a better understanding of science benchmarks.
- The books provided knowledge of how to use them
- Insights into benchmarks and ridding curriculum of extraneous curriculum
- This workshop gave an excellent introduction for curriculum committees to get started. Excellent suggestion!
- Relevancy-organization-application
- Learning how to use the information presented in the 2061 resources.
- Relevant material.
- The presentation activities directly met the needs of our district.
- It gave us direction in developing and organizing our science curriculum.
- The information was very helpful and can be applied to what we are planning to do.
- Time to connect to our curriculum
- Applying it to our curriculum
- I feel we are headed in the right direction. Our curriculum needs help.
- Learning how to align our curriculum with the Illinois standards
- Looking at each district and their specific needs
- Application to current curriculum
- Science instruction will improve in our District when these activities are implemented
- Discussing the aspects of my curriculum and how they match the benchmarks
- The time to start an action plan for improving our school district curriculum.
- I learned that our school is on board with mapping our science curriculum.
- This program enforces the work we have been doing for the last 6 years, building our physics/chemistry curriculum.
- Discussion & planning for change in our district
- The activity focused the goals of our district and my personal teaching
- This is a valuable activity, it will greatly enhance my science teaching and the science curriculum of the district
- Learning to use the Benchmarks to evaluate my curriculum.
- Understanding the process of using benchmarks and applying them to the curriculum K-12
- Finding holes in the curriculum
ISBE 77-21: “Best Feature” – Presentation Style

1. Introduction to Benchmarks for grade levels throughout the district. 2) Small group work and discussion with educators from other districts. 3) Participation in model lessons.

- Moved along - organized - good group of people.
- The presentation by the instructors. The exploration & use of the AAAS manuals.
- The content was very exciting but the presentation of the material was boring and did not flow enough to maintain my attention or interest.
- Lots of examples. Hands on activity.
- Presented from a multiple intelligences approach.
- As always, best instructional practice was used and modeled in the presenters work with us.
- The step-by-step process in which it was introduced.
- Group activities!

ISBE 77-21: “Suggestions for Improvement” – Presentation Style

- Choose more interesting topic to cover - activities were dry. First day was “hectic” a lot off task time 2nd day was better!
- Presenters need to improve on time/crowd mgmt; Also, same material presented over and over (day 1)
- Determine prior knowledge, prune subtopics and reduce wasteful repetition. Move at a faster pace. Pick up feedback from group on first day to alter instruction second day (notice how many left early or the trouble keeping participants on task.)
- More model lessons, less repeating of standards & pulling apart of wording etc.
- More organized, concise … assume we are as intelligent as we are.
- Organization  Faster pace  Meaningful activities
- Incorporate school curriculum in both math & science. Allow time for teachers to look at strands & our science units.
- More time  More practice lessons
- More small group interaction through specific related activities
- Make evaluation of the tools a more audience active process
- Too much sitting  This was information overload
- Too much sitting.
- Faster pace.
- Increase pace. More time to discuss & absorb material presented.
- Move more quickly.
- More dynamic/interactive presentation.
- A faster Pace of progress
- I would like to see a faster pace with the material presented. Sitting for a long period of time is difficult
- I am a visual learner. I am looking forward to see all the parts put together.
- Faster pace
- Start on time, too long on topics without a detailed debrief on the goals or objectives of the activity. (This was not modeled) Need a microphone with windows open, fan noises, a large group of people, etc. Give clear directions, put them on the board or overhead.
- Too much repetition! Not enough instruction by the instructors.
- Please don’t spend so much time repeating the same thing over & over!
- Pace increase (at times there was too much time between activities) This room was not conducive to a large group presentation with open doors, open windows, fan noise etc. (no microphones)Not enough washroom facilities.
- I’m not sure how you would change this but the first day I found the “table” talk from groups distracting. Perhaps this could be addressed.
- Begin the session earlier, so we can get out earlier in the afternoon (our school day is over at 2:25) Binder should include all readings, it was difficult for 5 people to use 2 books.
- Start earlier in the morning and end earlier in the afternoon
- Smaller group
I’m sure the presenters are knowledgeable in their field, but I had problems connecting with their communication style.

The step by step process was good, but the time for activities & Q. & A. should have been much shorter. Presenters seemed to stretch the activities.

Need to have all materials talked about - organization - very dull

Vary your presentation to what the professionals attending need - we could have attained the same info you spoke about by reading the books.

Make sure you present your presentation appropriately - this does not correlate directly to the state standards.

There were no experiments or lessons that help highlight the foundation (K/l) of a scientifically literate grade schooler.

Focus more on how 2061 program can be integrated - not useful alone. Group work/share would help to discuss how the state standards are implemented. Would be useful to share activities and curriculum implementation.

Start earlier in the morning so one can end earlier.

More hands-on activities

Organize a little better

Presentation was a little convoluted.

Work on ease on transiting from one section to the other

It was a little slow @ times

A bit slow & more interaction would be great

Move to specifics quicker, the second day was more useful than day 1

ISBE 77-21 “Suggestions for Improvement” – Activities/Content

Choose more interesting topic to cover - activities were dry. First day was “hectic” a lot off task time 2nd day was better!

Presenters need to improve on time/crowd mgmt; Also, same material presented over and over (day 1)

Determine prior knowledge, prune subtopics and reduce wasteful repetition. Move at a faster pace. Pick up feedback from group on first day to alter instruction second day (notice how many left early or the trouble keeping participants on task.)

More model lessons, less repeating of standards & pulling apart of wording etc.

More organized, concise … assume we are as intelligent as we are.

Organization. Faster pace. Meaningful activities.

Incorporate school curriculum in both math & science. Allow time for teachers to look at strands & our science units.

More time. More practice lessons

More small group interaction through specific related activities

Make evaluation of the tools a more audience active process

Too much sitting. This was information overload

Bringing order forms for the books. Doing more analysis of comparisons to see. Teaching standards and national teaching standards.

Too much information; monumental task all at once.

More time to look over the book tools.

The clarity of some of the lessons needs work… The paramecium?

Consolidate information into 1 day or 1 1/2 days.

Have more examples from K-5 level

Talking about topics at many levels, not just upper levels

It would be great to have more K-2 examples presented and examined

I would appreciate some examples at the K-5 level

Clarify the tools more on the first day, how they work, etc.

Analysis of materials at an elem. Level

More possible lesson plans.

Limit repeating the lesson on systems from 3 examples extensively covered to 1 extensive and 1 overview.

Please do not start out a presentation by convincing everyone that they are stupid and scientifically illiterate.

More activities, less lecture/reading and no homework

The workshop is well planned at it is
Would like to hear from districts that score high on the state's test yet are not using textbooks
More activities
More problems
More involvement of aligning benchmarks to curriculum
Daily lesson plans leading up to presented
Samples of how evaluations used for benchmarks & sample lessons
More ideas for classroom & teacher improvement
Make more connections for the classroom teacher!

**ISBE 77-21 “Comments” – Appreciation**

1. Thanks!
2. Look forward to working with you.
3. You did an excellent job. I hope you have the opportunity to come to our school.
4. Thank you!
5. Thanks
6. Thanks for your time & expertise
7. Great workshop! Wish it was mandatory for curriculum specialist from district to attend.
8. Very disappointed w/the 2 days
9. Outstanding workshop-the best one I have attended in 3-years
10. Outstanding workshop-the best one I have attended in 3-years
11. Thanks! I really enjoyed this workshop. We do need or could use more
12. I wish our entire staff could have participated. Science literacy is weak among elementary teachers.
13. Thank you! This supports some of my beliefs. I especially love knowing that teaching less is really teaching more.

**ISBE 77-21 “Comments” – Accommodations**

1. Good food.
2. Location was good and facility was comfortable
3. Too hot, need air
4. Air Conditioning for a hot day & large group of people.
5. Great lunches
6. Lunch was great
7. Facility: tables & chairs - very good
8. Room temperature - poor (air cond.)
9. Food - very good
10. Very nice food
11. Cooler room for a start, I also would have liked to have spent more time studying the state learning standards for science.
12. The heat seemed to bog down our whole group. The lunches were excellent. Beginning instructions before the official start time is extremely disconcerting. I was here on time and still felt behind at the beginning.
IMSA 2061 REFLECTIONS ON DAY ONE

Reflections on Day One: Impressions/Insights about the Need for Change
(Examples randomly selected sample from N=165 responses.)

- 5/1/01 Interesting discussion within the group on what the log was composed of. I wonder if we asked individually that question how many of us would have gotten the correct answer of carbon.
- 5/1/01 That you can do "in-depth" thinking with simple "props"...
- 5/1/01 I have an enlightened understanding of systems. That the approach and use of learning itself as a system necessary. We all ant the meaning and why of life, etc.
- 6/19/01 GREAT INTRO! I plan on using something similar in my classroom to assess how I am doing at teaching "concepts".
- 6/19/01 I think it's terrific that research can continue to focus on how learning occurs and that it goes back to the learner constructing their own understanding of concepts and then connecting them and assimilating them into their knowledge base. This has great impact on the idea that the focus must me on LEARNING-and then, indirectly, on teaching.
- 6/19/01 Students need to learn and understand what we "Think" they are. We have the materials (reference books, equipment). Using it all in a better approach will provide the above achievement.
- 6/19/01 Video showing children & Harvard grads was very powerful.
- 6/19/01 Defiantly shows a need for change
- 6/19/01 -Students have misconceptions on photosynthesis as a process, and it's result -When teaching a topic, one should determine what students know and build upon and/or reshape that knowledge -I need to focus on processes more during my plant unit.
- 6/19/01 Surprised that there seemed to be so little growth in scientific thought throughout the education of students.
- 6/19/01 I was surprised that older students held on to enormous information
- 8/16/01 I have heard about the "need for change" before.
- 10/25/01 Must assess what students know- teach to their level -ensure they master the concept.
- 10/25/01 I liked the video clips demonstrating the similar knowledge among 4th, 7th, and Harvard grads. It had a strong impact on me and how we teach concepts.
- 10/25/01 Lack of basic science concepts (retain. Iron) concepts and terms
- 3/18/02 Midnight City Night- Students took the election information at face value.
- 3/18/02 Misconceptions that students may have.
- 3/18/02 Interesting to see the chart showing the flow from each grade-level's understanding. I like to see lessons that could be taken to many different level.
- 3/18/02 The "need for change" exercise presented nothing new. The obvious gaps in student learning occur because concepts like these are superstitiously given and never really taught the students
- 3/18/02 I felt that all of the themes and their presentations was excellent. There was a vast amount of new knowledge gains for me. *Midnight City *Standards *Goals *Lesson Plan layouts
- 3/18/02 What is said can be misconstrued. Examples cliché's 6 of 1 half dozen of the other. Meaning is all or interpreted.
- 3/18/02 Nice ice breaker/way to get started a discussion on use of statistics.
- 3/18/02 This activity has awakened the importance of literacy/reading/comprehension and communication skills
- 3/18/02 Mapping Different grade level learning Statistical Information Questioning
- 3/18/02 Explains the concept of this, Midnight City Election a good way to get us started
- 4/16/02 Movie was very enlightening
- 4/16/02 The volume for mass was an insightful thought. Good thought provoking activity.
- 4/16/02 Need to use the books for my science curriculum at school
- 4/16/02 Interesting to hear all the different ideas about the seed/log.
- 4/16/02 Need to see end product of science literate adult then move backward to see how along the way we can meet that goal
- 4/16/02 Very interesting- Amazing how students can go through 16 years of schooling and never challenge basic beliefs.
Reflections on Day One: Questions/Concerns about the Need for Change
(Examples randomly selected sample from N=94 responses.)

- 5/1/01 Any grant money available so districts could have set of tape to use make people aware that knowing and saying vocabulary does not equal understanding! I'm pretty sure that a tape IMSA offers video course with college credit to watch and discuss?
- 5/1/01 Quality rather than quantity is still difficult with as many advocate groups as well as assessment results required
- 5/1/01 The extent of systematic change and having to avoid the dissonance with peers as change is moderated.
- 5/1/01 Where to begin? Do we go through each strand map one by one until we get through it or do we first order the topics sequentially.
- 6/19/01 Please tell me that those Harvard students had partied the night before. It's hard to believe that they could not explain the process of photosynthesis.
- 6/19/01 How do we link principles and ideas such as BENCHMARKS, PBL, etc...to the larger pedagogical ideas of construction, inquiry, and brain research? How do we communicate this to new teachers so they see the BIG PICTURE? How do we refocus staff to direct their emphasis on student centered learning as opposed to teacher directed teaching?
- 6/19/01 Just more examples and "How To's".
- 6/19/01 I am glad our district has not just selected new materials.
- 6/19/01 You're teaching to the choir. We wouldn't be here if we didn't see the need.
- 6/19/01 Researchers may always be able to find some bits of information students don't know; how can we be assured students become science literate?
- 6/19/01 How do we get the maps to be workable in K-8 so we se and use the strands of thought in our teaching.
- 6/19/01 How does a school district align their curriculum in order to teach key concepts? Release time for teachers to study takes they away from their classroom-not always the best solution. It seems that a large segment of time is needed to study curriculum and where does that time come from.
- 6/19/01 1) Are students being responsible for their learning? 2) Let's not remove the responsibilities from our students and place it all on the teaching profession.
- 6/19/01 How to we train our science teachers to be aware of this & teach appropriately?
- 6/19/01 Maybe a few more things to demonstrate the need.
- 8/16/01 Did they have or receive the knowledge. Teachers who teach.
- 10/25/01 How do we begin and how do we determine what is unnecessary.
- 10/25/01 Since I'm not a biologist (and have no desire to be one), the lesson was a little difficult for me to follow.
- 10/25/01 I think there is a recognized need - the difficulty is determining a common need- reaching consensus in a district or building.
- 3/18/02 Students need to discover hidden information, which the teachers must help with.
- 3/18/02 None
- 3/18/02 Are there more concrete ways we can see how to help students get the big picture- Where would I look-good Internet lesson plans etc...
- 3/18/02 Could be used as a PBL minus question
- 4/16/02 Where could I get more depth of knowledge on this particular concept.
- 4/16/02 Class needs more input and involvement. Needs more hands on activities.
- 4/16/02 It would help to have a list of common misconceptions that students (people) have concerning science.
- 4/16/02 I feel you spent too much time on this. Most of the people here indicated at the beginning of the day that they knew there was a need for change.
- 4/16/02 What type of instruction will address this problem.
- 4/16/02 How do we develop a method for "understanding or curriculum" that will leave enough "substance" to develop a good research based science curriculum.
- 4/16/02 Concerns- Showed ignorance of some teachers in room
Reflections on Day One: Impressions/Insights-Tools for Science Literacy
(Examples randomly selected sample from N=155 responses.)

5/1/01 Going through the sequence itself gave me an idea of the timing that might be needed
5/1/01 It was informative to hear the developmental stages of the project as well as the time line sequences of
5/1/01 corresponding walks and studies
5/1/01 The wealth of knowledge and insight that have been gleaned from experience, best practices, and
5/1/01 standards...
5/1/01 the integration of STAA research benchmarks, etc. I will look differently at what it is I do to facilitate
5/1/01 learning
6/19/01 I love the books. I am going to urge the district administrators to purchase them for our building. I'm
6/19/01 also going to get Science for all Americans to learn what I missed because of my inferior science
6/19/01 education.
6/19/01 Wonderful that all three tools correlate easily, so that teachers have powerful information in a usable
6/19/01 form.
6/19/01 The Science for all AM and Benchmarks are effective in that they provide. The background and
details. All components can be used effectively to plan, develop, and "sell" the curriculum to school
boards and other teachers.
6/19/01 Your introduction of Science for All Americans, benchmarks, and the atlas was effective. I see how
6/19/01 they complement each other and why our science teachers copies of their own (& the inservice).
6/19/01 Good resources. Why am I just leaning about them.
6/19/01 The tools seem excellent, however, logistically it seems unrealistic to have an entire faculty well-versed
6/19/01 in under standing & using there tools unless years of time are provided & supported within a district.
6/19/01 Informative, however, I don't think these books will have much meaning to regular classroom
6/19/01 teachers. They would not be interested with their limited amount of time. I think workshops would be
6/19/01 necessary for all teachers who teach science, not just science teachers. Also, administrators need to be
6/19/01 in on this.
6/19/01 I liked the tools-they appear to be very useful once you know how to use them. I liked that they
6/19/01 focused on what to teach and the grade levels the information should be taught.
8/16/01 The books are very good. I would like copies. Perhaps when we go through the 2 yr. program.
10/25/01 Science for the Americans benchmark for Science literacy atlas.
10/25/01 I think the tools are very easily understood. I like the "Also set" box in the textbook. I especially like
10/25/01 the strand maps with benchmarks at each grade level.
10/25/01 Info that builds.
3/18/02 Maps- Not all students are a grade level according to teachers.
3/18/02 I was and have already used the 2061 benchmarks. These are wonderful tools for curriculum
3/18/02 developers and classroom teachers. If trained on how to use them more effectively
3/18/02 None
3/18/02 Need to construct standardized test that are relevant and good. Have an adult literacy achievement
3/18/02 standard.
3/18/02 Reading piece was on target. We need to have a better sense of what is feasible at different stages of
3/18/02 our student's intellectual growth.
3/18/02 Tools are great if we at the 8th grade level have the cooperation of the district to make sure all grade
3/18/02 levels follow the mapping
4/16/02 Benchmarks for Science Literacy and Science for All Americans both seem like very valuable
4/16/02 resources. I do plan on consulting them.
4/16/02 The Atlas is a terrific book and I look forward to the completed work that compares the benchmarks
4/16/02 with the Illinois standards.
4/16/02 I need to study more about the project before I can make an informed discussion
4/16/02 The whole "Project 2061" makes a lot more sense to me.
4/16/02 These tools will be very useful for our curriculum planning & decisions.
4/16/02 Material to be used to reach goal of science literate adult on Science for All Americans. Benchmarks
4/16/02 for Science! History and Atlas of Science Literature.
4/16/02 Benchmarks are supposed to address sequential knowledge issues.
Reflections on Day One: Questions/Concerns-Tools for Science Literacy
(Examples randomly selected sample from N=94 responses.)

- 5/1/01 except I forgot to note our beginning and ending time, so could you tell me how long we took for the study?
- 5/1/01 Need to acquire these books... so I can be well-informed and reflect on the "process and product" of our curricula across our district.
- 5/1/01 Where do we as a teacher begin?
- 5/1/01 I still have some concern that some teachers will close their doors and do what they have always done. But this is my burden to overcome!
- 5/1/01 If one of the givens is to provide science literacy for all Americans, then how are we to succeed in this endeavor if H.S. students are required to enroll in one or two year science courses to earn a diploma? (As an aside, there are benchmarks targeting 9-12 grade students that are an integral part of project 2061)
- 6/19/01 We need to get these into the hands of teachers quickly, especially since many elementary teachers are nonscientists. They will gain a greater understanding of the concepts which will lead to greater student understanding.
- 6/19/01 It concerns me that we were not already using these resources.
- 6/19/01 I need to order them. How do the IL standards mesh with the benchmarks? Specifically what is included in the IL standards that our students will be tested on that is not included in the benchmarks. Any resources, or do we need to do comparisons on our own.
- 6/19/01 When can I make time to become knowledgeable about what & how to teach in my science classroom using the science literacy tools?
- 6/19/01 Using all these texts seems ? for most teachers. How can the ideas be simplified.
- 6/19/01 It worries me that some curriculum may be dropped-in order to teach key concepts in depth but the information dropped will be tests on ISAT & CAT-two other tools used to assess student performance. Unfortunately those are the (tools)scores published.
- 6/19/01 My concern is will teachers actually take the time or even have sufficient time to mull them over. The teachers attending the seminar are interested, but will those who are not present be motivated to read them?
- 6/19/01 Implementation is difficult. Time for rewriting curriculum is hard to find.
- 6/19/01 Please allow participants a chance to pursue books on table with some explanation.
- 8/16/01 How effective is the strand map when the schools don't work together?
- 8/16/01 What science programs does IMSA recommend schools to implement?
- 10/25/01 Not realistic for all teachers.
- 10/25/01 When will there be time?
- 10/25/01 Same as above.
- 10/25/01 How can this information be disseminated to all teachers?
- 3/18/02 Where and how can we obtain the Atlas on Science Literacy.
- 3/18/02 None
- 3/18/02 None
- 3/18/02 Will this work? now long before at (project 2061) has an impact on our schools.
- 4/16/02 Lack of Atlas
- 4/16/02 How soon do you think it will be until it is available.
- 4/16/02 Liked the benchmarks break, it's understandable.
- 4/16/02 Who's got the time (alone & working with other teachers) to implement all the great ideas etc...
- 4/16/02 Benchmarks seem rather general & superficial (how do you insure teacher's adhere to them)?
- 4/16/02 I think we need more books per table.
- 4/16/02 We got the idea the first time!
- 4/16/02 Benchmark & Project 2061 is a tool, not a curriculum. Good tool to include when developing curriculum. Good reminder to teach interdisciplinary-science throughout. Not always easy to do because of set curriculum and standard tests. The question that always comes up-should one teach to the test or not?
- 4/16/02 How can we use them in everyday workings.
Reflections on Day One: Impressions/Insights-Benchmark Study
(Examples randomly selected sample from N=147 responses.)

5/1/01 So many sources of information at our disposal to review. At times I find it a bit overwhelming. Our
district has for many years aligned the standards to our curriculum.

5/1/01 Good practice... especially when the concept of benchmarks may be fuzzy...

5/1/01 This method let me know how little I do in delivering material, concepts, etc. Time was involved but
the actual changes plans

6/19/01 I like how everything is correlated. I wish the state standards also matched the benchmarks so it
would be easier to use the books as references when aligning curriculum.

6/19/01 Great connections! It almost accomplishes a sort of conceptual scope and sequence rather than a text
or content scope sequence.

6/19/01 It's great to have a concrete method to "fix" or modify the "in" place curriculum. Very enlightening.
(I'm so glad that we now have the tools).

6/19/01 The links among the 3 resources are effective.

6/19/01 Useful tool

6/19/01 This is a very thorough approach at analyzing a specific science topic. I appreciate the organization &
the interrelated data. I see this as being the true information teachers should be following & designing
their programs around. This is much better than providing a multitude of activities without
explanation of why they should be used.

6/19/01 Helped clarify points. Brings the ideas to be taught into better perspective at different levels, plus
alerts science teachers to misconceptions.

6/19/01 It helps a teacher to focus on what they are going to teach. Helps with key concepts with research,
learning goals & mapping.

6/19/01 The benchmark study was helpful in learning how to use the books. It was very helpful to go
throughout step by step to see what to look for and how the book are organized.

8/16/01 I do like the idea of benchmarks steering curriculum.

10/25/01 Simple language is nice. Concept maps are nice.

10/25/01 I liked seeing how the concepts progressed in sophistication.

10/25/01 Great framework.

10/25/01 Good idea.

10/25/01 The process was explained well.

3/18/02 What I read- Questions in our instructions are imperative to the students discoveries and
understanding of graphs.

3/18/02 That these benchmarks are the umbrella over the Illinois Learning Standards & that using them can
further streamline instruction.

3/18/02 It is important to understand the benchmarks and where they fit into the curriculum.

3/18/02 This was a great comparative study to allow us to understand how the four support each other. Great
exercise!!!

3/18/02 None

3/18/02 Sequential learning needs follow up throughout the entire learning educational process.

3/18/02 Benchmark continually learning from grade to grade. Great idea!

3/18/02 Good idea the way it builds up

4/16/02 I liked the idea that Kindergartners look at parts and then 3-5 looks through microscopes and it builds
from there.

4/16/02 Being able to look at the Illinois standards and compare them with the Benchmarks was very valuable.

4/16/02 Like the way the book is set up

4/16/02 Made the process of how to use the Project 2061 materials much clearer.

4/16/02 Focusing on classroom implications was very helpful.

4/16/02 Use the benchmark book to find what children should know by end of elementary school, then go to
Science for All Americans to get the background science, and finally use the strand in the atlas to
make sure kids are covering what they are suppose to.

4/16/02 Flow charts were rather confusing-This could be helpful to see if concepts are being learned at
developmental levels.
Reflections on Day One: Questions/Concerns-Benchmark Study
(Examples randomly selected sample from N=80 responses.)

1. 5/1/01 I'd like to spend more time with design book and maybe resource book, I am not as formal with those
2. 5/1/01 Money
3. 6/19/01 A must for evaluations/developing curriculum for students.
4. 6/19/01 Once again I see time as an overriding issue.
5. 6/19/01 Concern is the amount of time to be devoted to relating benchmarks to curriculum in school.
6. 6/19/01 None
7. 6/19/01 Time is always a premium with teaching. I don't know if an individual can do the study with every
   topic that is taught/presented. It is necessary to prune, but administrators (I feel) are not in
   agreement.
8. 6/19/01 Do we go through the same process with our staff? My concern is they might find it tedious.
9. 10/25/01 I want to know who created the Benchmarks and why they chose various topics for people to know.
10. 10/25/01 Needs to be done- summer, process too long for most teachers.
11. 10/25/01 Buy in of staff. How to get veterans and new alike to see the need to "prune" favorite topics.
12. 10/25/01 This needs to be explained better - I didn't understand the workings of the lesson. I am a little slow
   though.
13. 3/18/02 My concern is that the students must have some type of scheme on what they are being taught before
   understanding it.
14. 3/18/02 Back-up plan for no books? Is there a way for more hands-on to discover the benchmarks? (instead
   of just reading about them).
15. 3/18/02 None
16. 3/18/02 Can we get these ideas across
17. 3/18/02 How do we sell this idea to our departments and school systems. Lots of participation from many
   different people in order to be a successful program.
18. 3/18/02 Are these really going to work if the state ISAT & PSAT don't reflect the standards?
19. 3/18/02 I hope that teacher training changes.
20. 3/18/02 What are the various ways they can be used to assess the curriculum? Do any benchmarks overlap, or
   do they just build on each other?
21. 3/18/02 Better if looked at IL learning standards also.
22. 3/18/02 Very difficult to understand the materials covered
23. 4/16/02 Not aligned with the Illinois Learning Standards.
24. 4/16/02 How much can you abandon? We say that this is what our students need to know. What happens if
   this body of authorities has misguided a generation of future adults.
25. 4/16/02 Great book, that I will read and incorporate into my classroom.
26. 4/16/02 Can we spend some time looking at more benchmarks? Is there a list or chart that shows all the
   benchmarks across grade levels?
27. 4/16/02 Good for elementary but not much for high school
28. 4/16/02 We repeated the same activity way to many times. We figured it out the 1st time. How does it
   coincide w/state standards? Should've shown that.
29. 4/16/02 System vs. Subsystem What models to use?? Conceptual or physical models? ? of questions &
   information of the same concept. Teachers need to make sure to discuss /ask /connect questions and
   concepts (age appropriate)
30. 4/16/02 If everybody buys in will we be ok otherwise what can they accomplish
31. 4/16/02 I am concerned that the other committee members will not understand that this is an on going
   process-not a quick one time project.
Reflections on Day One: Impressions/Insights-Model Lessons
(Examples randomly selected sample from N=145 responses.)

- 5/1/01 -Great! -Practical! -Real-life applications! -less IS better -can hopefully have richer dialogue with "less" than "more."
- 5/1/01 Question sheet excellent Very appropriate for math
- 5/1/01 Seeing, feeling, smelling, manipulating are important for true learning to take place.
- 6/19/01 Great reinforcement that learning at all levels begins w/making connections w/prior knowledge and discovering beyond that. Also - the questions we and students ask can often be more meaningful than the answers they seek.
- 6/19/01 Simple modifications make a huge difference in student understanding and thus, retention.
- 6/19/01 Since no one in our workshop teaches 9-12, I wish the lessons had been k-8. It's easy to cut/prune from someone else's curriculum! It would have prompted a livelier discussion & perhaps reflection (even) if we'd discussed a topic near and dear to some.
- 6/19/01 Interesting.
- 6/19/01 This lesson points out that older students must have the foundations from earlier years of educational experiences. Individual teachers cannot do it, all the focus must be team oriented.
- 6/19/01 Nice, but not particularly inspiring for a sample.
- 6/19/01 I enjoyed the lessons and the thought provoking questions. The questions were very helpful in breaking up the parts and seeing how they work together. The paramecium computer video's were great!
- 10/25/01 Systems Systems Systems
- 10/25/01 Well done! Showing primary & high school lessons based on parts was good. It is especially interesting to me because I'm about to teach Microscopic Life & I will definitely have a different approach.
- 10/25/01 Framework sound great research ???.
- 10/25/01 Limit the amount of modeling.
- 10/25/01 Showed clearly how to tie cells to systems by talking about diverse systems.
- 10/25/01 The lessons were thought providing. They made me look at things in a different light and see that I could connect things in a different manner.
- 10/25/01 Developmental lessons building on real-world examples and then moving to concept.
- 3/18/02 Jumping Jacks Activity- Not all graphs looked the same but had the same information
- 3/18/02 These lessons helped to see how to modify what is taught to make sure it is important to literacy.
- 3/18/02 It is really nice to be able to do a sample lesson that the standards can do. We are adopting connected math next year. This was a great way for me to see how to teach this type of lesson.
- 3/18/02 This was fun but difficult for me to really respond/think like a 7th grader, (but I think we got the point in learning how to present what is important/relevant for students to learn).
- 3/18/02 None
- 3/18/02 Discover how different thinking methods and backgrounds can influence standardized learning objectives.
- 3/18/02 Model lesson on cells & Bicycle system was excellent.
- 3/18/02 Like to have models. I could have used in classroom Liked bike idea
- 3/18/02 Very good model lessons Variety & good questions
- 3/18/02 Jumping Jacks/Variables Way too much exercise Great model to experience Great data & insight for graphing.
- 4/16/02 I thought the Kindergarten lesson was good.
- 4/16/02 Liked the 2nd grade lesson. The 9-12th grade model didn't seem to hold most peoples attention.
- 4/16/02 I like the incorporation of tech into the lesson.
- 4/16/02 Just like our (my) students need to see examples, so do I. Again, makes the process manageable.
- 4/16/02 Parts to whole- Start with toys-progress to things in the room that have parts, then outdoors to nature that is in parts.
- 4/16/02 No insights/discoveries These were very basic.
- 4/16/02 I like the ideas. I think they would make students think a lot about what they are studying.
Reflections on Day One: Questions/Concerns-Model Lessons
(Examples randomly selected sample from N=70 responses.)

- 5/1/01  I'm not sure how strong the conclusion was presented, like ok, its a system - so what - we've heard about systems before - could be too repetitive just like other "topics" or "units" that are taught.

- 6/19/01  How do we deal with student's misconceptions that are reinforced in the home. Mom and Dad always know "the truth".

- 6/19/01  Perhaps more talk about the "constructionist" tilt of the lessons designed. Many teachers can design hands-on lessons, but without the coaching component, the power of inquiry is lost.

- 6/19/01  Where are they found? Any books on them?

- 6/19/01  Are there lessons for all benchmarks?

- 6/19/01  I worry that students given even less information (i.e. no vocabulary terms-no scientific reading out of textbook) will have an even harder time. Student accountability has to be more than performance in class.

- 6/19/01  None

- 6/19/01  I wonder how/where the model lessons would fit into our curriculum. What grade? When? Is it a stand alone? Is there any connected curriculum?

- 6/19/01  Where did Lesson Plans "Exploring Parts & Wholes" and "Seeing Cell as a System" come from?

- 8/16/01  I don't get the relevance of the paramecium. (Maybe I missed it in my absence.)

- 10/25/01  Needing to talk to high school teachers in another district that our kids feed into.

- 10/25/01  Time consuming- too much for some teachers to do- need support from curriculum.

- 10/25/01  At what point does time become a determining factor.

- 10/25/01  Why did you focus on second grade, and high school only? I teach 4th grade!

- 10/25/01  More example lessons would be great.

- 10/25/01  Not a concern, but a positive- the progressing of ideas would be adaptable to learners at all levels including ESL student without making separate materials.

- 3/18/02  Students don't understand what I wrote.

- 3/18/02  None

- 3/18/02  The model lesson on systems was more universal & easily fitted for all of us. Cells seemed middle school & high school.

- 3/18/02  Most teachers will find these different to do in the classroom at elementary levels.

- 3/18/02  1. Can you take us through a simulation of another topic? 2. Can you have us bring our own units to analyze?

- 4/16/02  Need to write better lessons. I think the high school level system lesson would bore students. Bored students=classroom management problems.

- 4/16/02  Would it hold pupils attention?

- 4/16/02  To long and not hands-on. Too much repetition of the same information.

- 4/16/02  Could you split the group according to grade levels taught (K-6/7-12) and do different model lessons with each group? Also, I would like to see model lessons on more than one theme, instead of multiple lessons on the same theme (systems).

- 4/16/02  Would high school students stay with this discussion for 4-5 days?

- 4/16/02  We need to allow students to look at a concept from various perspectives.

- 4/16/02  I teach high school what did you do for me.

- 4/16/02  I would like to see model lessons that are middle school appropriate. Are there websites that have good middle school lessons that are aligned with project 2061 benchmarks?
Reflections on Day One: Other Thoughts?
(Examples randomly selected sample from N=64 responses.)

1. 5/1/01 Great! Great start... "things" kept moving along! I enjoyed reflecting and discussing readings... since we don't get many opportunities to do that. 2. having an activity after lunch is a good "strategy"... (so we couldn't get board or tired) 3. I am excited about the "possibilities for our school district 201-U" thanks, I'm willing to reflect on "what I do?" also will not the completely the same when ? in class I did not know what to expect from this session, but it proved to be very valuable.

5/1/01 what project 2061 is seeking to achieve, regarding students performance should become the mission of every discipline taught by school

6/19/01 I guess last night's reading made me more comfortable with the purpose of 2061. I am a "big picture" person and was a bit frustrated yesterday when I couldn't see it all fitting together. I could see that our district is on the right track. We just have to get everyone on board. Implementing our curriculum is not the challenge.

6/19/01 I made some new connections and plan to make use of these tools in a new and different way.

6/19/01 Pacing and alternating presenters was effective.

6/19/01 Food for thought about how to "prune" the curriculum. For a long time another teacher (8th grade science) and I have been wondering what to leave out as we are asked to do more and more.

6/19/01 I'm energized! This is a great blue print for a change. I'm concerned with how students will perform on the 4th & 7th grad ISAT-Science after the curriculum is changed/adopted. Our district's parents scrutinize ISAT results and demand students perform at the "above level". P.S. Doing this reflection is an excellent way to mentally review yesterday and be ready for today. Thank you for the fine work you are doing.

10/25/01 Interesting workshop. I'm glad our school is concept based so incorporating benchmarks will be a little easier. Also, the fact that we were involved in curriculum mapping last year show that District 118 is on the right track.

10/25/01 Repetitious - some activities could have been streamlined.

3/18/02 Make sure goals/expectations are clear when starting the day.

3/18/02 Remember I teach other subjects-so can I really plan with all this mapping-it would be great to be able to spend this much time on each unit.

3/18/02 Lecture less student including adults...more worthwhile to bring in curriculum that is used at the district and see where it fits on the Project 2061 maps.

3/18/02 Could we possibly move a bit quicker through these discussions-after the example, etc...

3/18/02 Using the system questions could be used in many curricular areas (all)?

3/18/02 Technology?

3/18/02 I liked the presenter and lunch was good. They needed more turkey sandwiches, please!

4/16/02 It was more difficult to hear the lesson in the afternoon? Do you think it was due to the wide diversity of teaching levels?

4/16/02 We need more time to look at the benchmarks themselves.

4/16/02 I thought there would be more experiments and ways to get understanding of concepts across to elementary kids. How do you take it well enough to pass ISAT'S and chapter tests?

4/16/02 What adults should know about science: Who is to determine? Why is this important to know.? I wanted more hands-on, concrete lessons. Theory is fine but you need to back it up w/practical experience.

4/16/02 I don't understand how this applies to me-I have not control over what gets taught, except in my own classroom. I was hoping for an exchange of ideas regarding what projects/experiments to do in class.

4/16/02 Much of the day seemed redundant Would like to look at some of the other main themes (modeling change etc...)

4/16/02 Its nice to see that science educators throughout Illinois are changing or detailing their science curriculum to and in respect to Illinois and National Standards.

4/16/02 I thought I could get good concrete lessons to take back to my classroom. Fooled me!