

MUSEUM OF SCIENCE AND INDUSTRY

TEACHER PROFESSIONAL DEVELOPMENT SERIES

***GET ENERGIZED!* MODULE**

FORMATIVE EVALUATION REPORT

Erin Stafford
Evaluation and Planning
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EXECUTIVE SUMMARY

The purpose of the Museum of Science and Industry's new Teacher Professional Development Series (TPDS) is to improve student performance in science by enhancing their teachers' science content knowledge, instructional strategies, and museum skills. By combining solid content, hands-on classroom activities, inquiry-based instruction, and tools for a successful Museum visit, the Museum seeks to assist 4th-8th grade teachers who want to help students explore basic science concepts in new and engaging ways.

The major goals for the overall Teacher Professional Development Series are as follows:

- Teachers will experience a positive change in Content Knowledge.
- Teachers will experience a positive change in Instructional Practice (Classroom Pedagogy).
- Teachers will experience a positive change in Museum Skills.

While the Museum plans to have a menu of content topics within the TPDS, the Teacher Programs team developed its first prototype module on the topic of energy (a.k.a. *Get Energized!*) for the 2006-07 school year. In the first year of the TPDS, the Museum sought to recruit 64 teachers (32 in 4th/5th and 32 in 6th-8th). Teachers who wanted to be a part of the program were required to complete an application, which included a signature from their principal, and to apply with a partner teacher from their school.

With the major goals of the TPDS in place, the goals for the first module were developed. After engaging in the year-long *Get Energized!* module (i.e. participating in four workshops, experiencing one classroom visit by a Museum educator, and attending a final graduation experience), teachers were to:

- Understand the basic concepts of energy and how various forms of energy are related.
- Increase their comfort level applying the energy content learned in workshops in their classrooms.
- Increase their comfort level in teaching science in an inquiry-based manner.
- Increase their comfort in teaching science using hands-on activities.
- Increase their comfort in using Museum resources in their classroom and on field trips.

Since this was the prototype year for the overall program and the first module of it, intensive formative evaluation was conducted on the workshops, curriculum and logistical aspects of the TPDS series. As a result, the Teacher Programs team was able to implement immediate changes to the program throughout the course of the year. Following the completion of the first year, Evaluation staff conducted an online survey, focus groups and staff debrief to assess the prototype year of the TPDS series in general and specifically the *Get Energized!* module. This report summarizes those findings.

Overall, the participants of the TPDS series were overwhelmingly satisfied with the *Get Energized!* module and the TPDS series in general. Participants reported gains in content knowledge and greater comfort with using the energy content presented in their classrooms. Participants also reported an increase in comfort using various teaching methods or pedagogy (e.g. demonstration, hands-on and inquiry-based methods). And finally, while teachers reported feeling more comfortable with the Museum of Science and Industry after taking part in the *Get Energized!* module, they felt like this did not necessarily translate to feeling more comfortable with museums or informal resources in general.

The most commonly mentioned reason for such high satisfaction with the program was that unlike many other professional development programs, the TPDS provided both content/hands-on activities in the workshops as well as the materials and resources necessary to implement them in the classroom. Other benefits such as the curriculum guides, the community of teachers involved, stipends/substitute coverage and free field trips and buses contributed the satisfaction of the teachers and the overall success of the first year of the program.

While the first year of the TPDS was popular and the goals of the program were met on a base level, the teacher participants as well as the Teacher Programs staff had many suggestions for improving the *Get Energized!* module as well as the program in general. Based on all of that feedback, the following are recommended to the team:

- Continue implementing, refining and growing the TPDS series based on the model that was tested this year.
- Continue developing curriculum for the modules. At the same time, staff may want to actively track the number of lessons teachers are actually using from each of the units and/or expose them to more lessons throughout the workshops.
- Explore the idea of hosting workshops on other days of the week. Saturdays seemed to be acceptable to most participants but keeping them to a minimum is recommended.
- Consider having an initial overview day before the school year to allow teachers to start planning to use the curriculum in some way over the course of the year.
- Allow more time for reflection and processing in the workshop days and for teachers to share their experiences with one another. Consider lengthening the workshop day to accommodate this.
- Establish more contact with the principals. Communicating with them more may create a stronger TPDS presence in the school, create more support for TPDS teachers within their schools, and make it easier to recruit more teachers from those schools in the future.
- Continue to provide the supply bins as part of the program.
- Keep the idea of partner teachers but consider mixing them up throughout the workshop days so that they get to work more with other teachers.
- Explore the concept of having a “teacher cohort” from each school, but possibly spread them out throughout the modules instead of concentrating them to one module.
- Pilot test the idea of having “veteran teachers” in the next module who could lead portions of the activities or reflection exercises.
- Actively define and clarify the purpose of site visits. Determine if there would be a way for teachers to co-teach a lesson with Museum staff as a part of the process.
- Keep the free bus and learning labs as part of the field trip experience. Consider options for departmentalized teachers who have more students than are allowed by current bus or lab space restrictions.
- Refine the website to make it more user-friendly or develop more of a listserv for teachers to more actively engage with one another or the staff from the program.
- Continue to stress content and pedagogy as part of the series.
- Clearly define and incorporate more on Museum Skills into the workshops and curriculum.

- Consider adding more staff to the program to keep it sustainable and meaningful to the teachers who are past and current members of the TPDS series. Consider ways to continue connecting with teachers in a one-on-one way and having meaningful interactions especially if changing behavior (i.e. change in pedagogy or teaching practices) remains a primary goal.
- Develop a way for teachers to remain a part of the program after going through their module.

After implementation of these changes, it is recommended that the Teacher Programs staff continue to refine the *Get Energized!* module and implement it in a pilot phase during the 2007-08 school year. Evaluation should be conducted on the module as well as the “teacher cohort” and/or “veteran teacher” concepts. Prior to the start of the next round of workshops, Teacher Programs and Evaluation staff should work with students to better refine the activities in the *Get Energized!* curriculum.

At the same time, Teacher Programs staff should continue to develop the next module *City Science* and begin to run it in prototype phase (i.e. 2006-07 *Get Energized!* module). The *City Science* module should follow a similar intensive evaluation plan as the first module did in 2006-07.

OVERVIEW

The purpose of the Museum's Teacher Professional Development Series (TPDS) is to improve student performance in science by enhancing their teachers' science content knowledge, instructional strategies, and museum skills. By combining solid content, hands-on classroom activities, inquiry-based instruction, and tools for a successful Museum visit, the Museum seeks to assist 4th-8th grade teachers who want to help students explore basic science concepts in new and engaging ways.

The major goals for the overall Teacher Professional Development Series are as follows:

- Teachers will experience a positive change in Content Knowledge.
- Teachers will experience a positive change in Instructional Practice (Classroom Pedagogy).
- Teachers will experience a positive change in Museum Skills.

While the Museum plans to have a menu of content topics in the future within the TPDS, the Teacher Programs team developed its first prototype module on the topic of energy (a.k.a. *Get Energized!*). In the first year of the TPDS, the Museum recruited 64 teachers (32 in 4th/5th and 32 in 6th-8th). Teachers who wanted to be a part of the program were required to complete an application, which included a signature from their principal, and to apply with a partner teacher from their school.

Through engagement in the *Get Energized!* module (i.e. participating in four workshops, experiencing one classroom visit by a Museum educator, and attending a final graduation experience), teachers will:

- Understand the basic concepts of energy and how various forms of energy are related.
- Increase their comfort level applying the energy content learned in workshops in their classrooms.
- Increase their comfort level in teaching science in an inquiry-based manner.
- Increase their comfort in teaching science using hands-on activities.
- Increase their comfort in using Museum resources in their classroom and on field trips.

EVALUATION

In order to ensure the quality of this new professional development initiative, in-house Museum evaluators conducted a focused formative evaluation on the first module of the TPDS. Ongoing iterative evaluations of this program will provide important feedback as the Education Department continues to research and refine teacher professional development experiences in accordance with the education agenda in the Museum's Capital Campaign.

In addition to the formative evaluation of the *Get Energized!* module prototype, the Evaluation & Planning team also explored questions regarding the benefits and challenges of doing this type of professional development with teachers. Results of this evaluation will inform the Teacher Programs team and the Evaluation & Planning team regarding future teacher professional development opportunities as the program expands.

EVALUATION OBJECTIVES

Based on the *Get Energized!* goals determined by the Teacher Programs team, the first stage of the formative evaluation will attempt to accomplish the following:

- Gauge participant reaction to the workshops in terms of format, content and delivery.

- Gather information to inform immediate changes to the logistical aspects of the workshops (e.g. delivery strategies, structure, timing, use of tools/exhibit artifacts, and age-appropriateness of the challenges).
- Identify challenges to participant interest and engagement in the workshops and make recommendations based on participant feedback and workshop facilitator discussions.
- Explore the connections participants are making between the content and pedagogy they are experiencing in the workshop and how they may apply it in their classrooms.
- Determine if museum workshop facilitators are effectively modeling inquiry, content and hands-on activities for participants.

Throughout the *Get Energized!* module, the Evaluation & Planning team sought to accomplish the following exploratory objectives:

- Explore the concept of offering teacher professional development through teaching content in a hands-on and inquiry-based manner.
- Identify the benefits and challenges of participating in this program for the teacher audience.
- Determine the perceived value of offering these programs for teachers.
- Gauge teacher use of resources, content, and pedagogy from the workshop in their classroom practice.
- Assess the features of the module (i.e. attending workshops, receiving free resources, creating a community of teachers, conducting classroom visits) that work and do not work for teachers.
- Gather information on aspects of museum skills that teachers have gained and what other skills they need to effectively use the Museum as a resource.

FORMATIVE METHODOLOGY AND DATA COLLECTION

During this prototype year for the *Get Energized!* module, the Teacher Programs team sought to focus on major improvements to the TPDS program. As a result, the following formative data collection methods were used to address immediate issues and make continuous improvements to the program. Since the feedback was delivered to the team throughout the process and incorporated on an ongoing basis, the results from each of these methods are not included in this report. Methods included the following:

Method One: Video Observations (N = 8)

Video observations were conducted during each of the module workshops in order to assess if workshop facilitators were effectively modeling the teaching that they were seeking to convey to the teachers. After each workshop, the Teacher Programs team and the evaluator met to watch excerpts of video and discussed suggestions for improvements in teaching for future workshops.

Method Two: Post-workshop Questionnaires (N = ~32 per workshop session)

The Post-workshop Questionnaire was given to teachers at the end of each of the workshops and the graduation event in order to gauge their reactions to the day's program and its components. Issues that arose from these surveys were passed along to team members to make the appropriate modifications prior to the next scheduled workshop.

Method Three: Facilitator Debriefs (N = 4)

After each set of workshops, the Teacher Programs team participated in a debrief session identifying and discussing changes that should be made to the workshops immediately. These changes often included

changes to logistical aspects of the day as well as modifications to improve participant engagement. Decisions from each debrief were employed in the following workshop.

Method Four: Site Visit Update (N = 1)

After a set number of site visits, the Teacher Programs team participated in a group debrief session to identify and discuss changes that could be made to the activities or methodology of the visit. This included changes to logistical aspects of visiting the classroom or presenting the hands-on/inquiry-based activities as well as modifications to improve dialogue with the classroom teacher about aspects of the pedagogy. Decisions from the mid-point debrief were employed in the following series of site visits.

END-OF-YEAR FORMATIVE METHODOLOGY AND DATA COLLECTION

After conducting intensive formative evaluation of the basic program throughout the year and implementing changes to the program, the Teacher Programs team was interested in the overall experiences of the teachers and the larger issues and changes that could be made for the following modules or the program as a whole. As a result, the following methodologies were used to explore the overall program and its specific components. The results of these are reflected in this report.

Method One: Post-series Questionnaire (N = 36)

The Evaluation & Planning team administered an online survey at the end of the *Get Energized!* module to all teachers who participated in the program. The survey attempted to determine the teachers' overall reactions to the module and to participating in the TPDS in general. This survey also focused on what worked and did not work about specific aspects of the program (e.g. providing stipends and substitute teachers, the supply bins, and the creation of a teacher community around the topic of energy). Thirty-six of sixty-four teachers responded to the survey.

Method Two: Post-series Focus Groups (N = 2)

At the end of the *Get Energized!* module, two groups of teachers participated in focus groups regarding the overall module, their use of materials, strategies, and content in their classrooms, and their reactions to the specific components of the TPDS. Eight total teachers participated in the two focus groups.

Method Three: Post-series Staff Debrief (N = 1)

In recognizing the amount of staff time and effort to deliver a new program like the TPDS, the Teacher Programs staff participated in a staff debrief regarding their thoughts on implementing overall module including developing the curriculum, conducting the workshops, securing materials, and logistically running a program of this size. All four members of the Teacher Programs team participated in the staff debrief session.

THE TPDS PARTICIPANT EXPERIENCE

Method One: Post-series Questionnaire

DEMOGRAPHICS

Overall, thirty-six out of sixty-four teachers responded to the online survey for a response rate of 56%. These respondents taught the following grades:

Grade	Percent
4 th	28%
5 th	31%
6 th	19%
7 th	39%
8 th	28%
Other	6%

Of those who responded, 53% were in the 4th-5th cohort of the program while 47% reported being in the 6th-8th grade cohort. All 36 teachers had a partner teacher in the program. All teachers attended the first two workshops while 86% attended the third, 94% attended the fourth, and 72% attended the final graduation event.

RESULTS

Content

When asked how their level of content knowledge had changed (of at all) over the course of the series, an overwhelming majority agreed that it had increased. The highest increase was in the area of energy in general (94%). In terms of specific content topics, 92% of teachers responded that their knowledge of mechanical energy had increased, 89% thought that their knowledge of kinetic and potential energy had increased, and 86% felt that their knowledge of electricity and magnetism and thermal energy had increased. Light and sound energy had the lowest number of people indicating that their knowledge increased (77% and 78% respectively). However, it is important to note that well over three quarters of the respondents indicated that their knowledge increased in all areas. Only one person indicated that his/her general energy knowledge decreased over the course of being in the program.

After attending the workshop series, 75% of the teachers indicated that they would be “absolutely likely” to use the energy content from the series in their classroom while only 9% thought that they may not use the content. Reasons given for such a positive response included the following:

- *I know my students have had limited exposure to physical science in the classroom. The content of these workshops delivers solid physical science concepts in easy-to-use lessons for me that are also engaging for the students!*
- *I will be using the workshop series in years to come because I have more confidence and the "materials" to make science exciting and an interesting learning experience that all my students can benefit from. You made it easier...thanks! We need all the help we can get.*
- *The content is easy to use, I have the supplies to make it hands-on and the kids really enjoy it. The curriculum has changed my attitude & confidence in teaching Science.*
- *The curriculum is clear and the materials are available. I don't need to reinvent the wheel; I just want to present the content effectively.*

In an open-ended format, teachers were asked to comment on how their comfort level had improved (if at all) in teaching science content over the course of the program. The majority indicated that their comfort had improved at least on some level. While many felt strongly that their comfort had improved, others mentioned that it had only improved a little. Of the few who thought that their comfort only improved a

little, the most common reasons given were that they had done a lot of learning on their own or had some background on the content prior to the program. No teachers indicated that they were less comfortable with the content after attending the workshop series. Sample comments from this question included:

- *Although I have a science endorsement, I was not very comfortable teaching science. This program has enabled me to feel much more comfortable with physical science. Although I still do not feel completely comfortable, I have gained a wealth of knowledge and am very excited to share this knowledge with my students.*
- *My confidence in teaching science has radically improved.*
- *I feel much more comfortable using labs in my classroom. I feel more confident with my explanations of these topics. The Get Energized books helped with my confidence. Again, I am much more confident!*
- *I am not afraid to try new things, and I know that there is still a lot more I would like to learn about science. I feel much more comfortable admitting what I don't know, and asking for help.*

Pedagogy

When asked about possible changes in their comfort level with doing demonstrations, hands-on activities, or inquiry, an overwhelming majority indicated that their comfort level had increased. Eighty-three percent of teachers said that their comfort level with demonstrations had increased while 89% said the same about hands-on and inquiry. None of the teachers indicated that their comfort level decreased in any of the areas after attending the workshop series.

When asked about their experiences using these strategies in their classrooms, 44% indicated that they had struggled with one or more of the strategies at some point over the course of the year. In looking at the open-ended responses, classroom management of hands-on or inquiry lessons was the most common trouble spot. Teachers stated, for example:

- *Sometimes classroom management was a challenge. Usually students were more engaged but then some students used the opportunity to misbehave.*
- *Sometimes students are not comfortable with discovery. I have experienced some difficulty with students taking the time to answer their own questions.*

Although teachers indicated that they had struggled, several said that they learned from these real experiences and had continued or would continue to practice the strategies highlighted in the program. Comments included:

- *I think that some of the hands-on or inquiry are going to be difficult to implement for 30 kids in a 40 minute period. I have no one to help me set up or take down. Also, some of the students I teach have a hard time not thinking of lab time as goof-off time. This will take some educating on my part.*
- *My problem was the hands-on activities. Allowing that "gradual release of responsibility" was difficult at first, because I as the teacher had less control.*

When asked if they had used any of the teaching strategies highlighted in the program for science topics other than energy, 56% said that they had. Examples of this included:

- *I have used inquiry-based instruction and hands on teaching methods in teaching biology units.*
- *My science curriculum helped me use these strategies with life science, health science, and earth science.*
- *I used the inquiry wheel for many science topics as well as to help students find a science fair question for their own projects.*

Of the 44% who said they had not, the most common reason was time limitations. Other reasons included teacher comfort or lack of curriculum and materials needed to support doing science in this way.

When asked if they had incorporated any of these strategies in disciplines other than science, 76% of the teachers said that they had. The most common subjects mentioned were language arts, social studies and math. Comments included:

- *I have tried to do more inquiry-based social studies webquests so that students are able to construct their own knowledge about a topic rather than regurgitating something out of a textbook.*
- *I have used it some in reading to make reading more interesting to the students.*
- *I've used inquiry at the beginning of language arts and social studies lessons.*
- *Inquiry wheel in my reading class.*

Similar to previous answers to the science topics question, common reasons for not using these strategies in other subjects included lack of time or having to stick to school mandated scripted curriculum. Comments included:

- *My poor excuse is time. When I realize that some of the teaching strategies that were presented could be used in math, I was already done teaching that particular lesson. I guess as a review I could have gone back and demonstrated to students how relevant a particular strategy is important in math.*
- *I teach only science and math, and the math series we use is very strict and scripted, leaving me little room for my own creativity.*

Museum Skills

Over three quarters of those who responded brought their students to the Museum at least one time this year. Of the quarter of teachers who did not, reasons for not attending the Museum included not being prepared or comfortable bringing their students or not being able to book the field trip experience that they wanted. Examples include the following:

- *As a first year teacher, I had a lot on my plate and never seemed to get around to scheduling it. Also, I was a bit nervous about watching my students all day off of my school campus.*
- *I wanted to, but again....trying to keep my head on straight this year!*
- *None of the labs were available for the times I wanted to take my classes. They were only available in June and we are not allowed to take field trips in June.*

The majority of teachers who did bring students enjoyed their experience at the Museum and the Learning Labs that they participated in on their visit. Comments included:

- *We took advantage of the 2 free lab classes which were a lot of fun for my students.*
- *I wanted them to participate in the activities. I wanted them to experience what I experienced when I attended the workshops. You left feeling more knowledgeable about topic and it made learning fun. Students enjoy learning when playing.*
- *Of course! I love the museum and wanted my students to experience it, too!*

All of the teachers who attended the Museum on a field trip attended one of the Museum's Learning Labs. (NOTE: These labs were provided as a free part of the TPDS program). Ninety-six percent used the free bus program to bring their students while 86% used the School Group Lunchroom while they were here. In addition to participating in Learning Labs, over two-thirds of the groups engaged in exhibit exploration and half saw a live demonstration on the Museum floor. Only 7% of the groups attended an Omnimax film. (NOTE: Omnimax films required teachers to pay an up-charge.)

Half of the teachers who came on a trip brought their class to the Museum only one time. However, 35% brought their students to the Museum more than one time this school year. When all respondents (i.e. not only those who had taken a field trip) were asked if they would bring their classes to the Museum next year, 97% indicated that they were absolutely or very likely. Only one teacher indicated that she or he would be unlikely to bring students to the Museum next year.

Open-ended comments echoed the positive feelings about bringing students to the Museum. These included the following:

- *I feel as if the Museum has much more to offer than I originally thought! I was very impressed with the Get Energized! workshops as well as the exhibits I was able to see while there.*
- *The museum has so much to offer to my students and it will be a rewarding educational experience.*
- *I could spend years exploring the museum with my students... and could never get enough of it!*
- *The experience was awesome. The kids returned to the school telling everyone who would listen about their experiences.*

Curriculum

In terms of how they used the curriculum this year (e.g. never, sometimes, a lot, or all of the time), 56% said that they used the curriculum "sometimes." Thirty-nine percent said that they used it "a lot." Only one teacher indicated that she or he did not use the curriculum at all this year while one responded that she or he had used it "all of the time." Reasons given by people who only used the curriculum "sometimes" included lack of time to do it or comfort with handling the topics. Examples included:

- *Time was an issue for us. We used some of the curriculum during our Math Day event.*
- *I felt that I needed to get a better handle on certain topics (especially sound and light) before I taught it in a classroom.*
- *I was feeling overwhelmed with trying to fit in new labs and doing science fair with 140 students. However, this summer, I will study everything more closely and come up with a plan.*

Yet those who had used the curriculum more often (i.e. indicated "a lot" as their response) spoke positively of using it in their classrooms. Comments included:

- *I enjoyed the workshop and learned so much I wanted my students to have the opportunity to enjoy doing some hands-on inquiry based projects.*
- *I learned from it, so why not teach from it?*
- *I used the curriculum to supplement a textbook driven understanding of physics. It was a great curriculum with labs easy to understand for both the teacher & the student.*

Since the workshop series began after many teachers had mapped out their curriculums for the current school year, program staff was curious as to how they would use the curriculum with their students in the upcoming year. Ninety-four percent said that they would be likely to use it next year with 72% indicating that they would be “absolutely likely” to use it. Open-ended comments included:

- *Now that I have the kits, I will be able to work them according to the scope and sequence guide.*
- *There are too many great activities to ignore.*
- *I have all summer to prepare a curriculum based on the Get Energized Workshops.*
- *The curriculum was very good and I want to provide more hands-on inquiry based activities in my classroom. My students will learn a lot while also having fun doing the curriculum.*
- *This summer I will study everything more closely in the binders and come up with a plan.*

Over three quarters of the teachers thought that “just the right amount” of background information was provided to teach the lessons. Seventeen percent thought that there was not enough information provided. Almost ninety percent of the teachers thought that there just the right amount of lessons included for each curriculum topic with only 8% thinking that there were too many lessons.

As part of the TPDS program, participants were provided with *Stop Faking It* books as pedagogical resources. Participants were split evenly between if they read these books or not. The most common reason for not reading the books was time. Of those who read the books, seventy-one percent indicated that they were useful with one third of the total participants indicating that they were “absolutely useful.” Ten percent of the teachers in this survey found these books “absolutely not useful” to them. Comments on the “Stop Faking It” books included:

- *Content geared toward teachers is helpful. The texts clarified for me misconceptions I had, so that correct information got passed down to my students.*
- *The books did a lot in breaking down abstract science ideas w/ concrete examples and demos. I absolutely used explanations in the book to explain the concepts at hand. They were excellent.*
- *They were helpful. I need to sit down and spend a little more time with them.*
- *I didn't get to read them all, but what I did read made it really easy to understand concepts. This will definitely help me be more prepared when it comes time for me to teach these concepts.*
- *I actually just skimmed through the books, but I have put them on my summer reading list. So, I will definitely read them in depth this summer.*

Workshop Logistics

In terms of the length of the workshop days, the overwhelming majority of the participants in the survey liked them as they were. Seventeen percent, however, wished that the workshop days were longer.

In terms of the ideal amount of workshop days for a series such as this, over half of the teachers said that this would depend entirely on the content that was being presented. Twenty-two percent indicated that

five days would be ideal. (NOTE: This was the number of days in the current series). Fourteen percent thought six or more days would be ideal. Only two teachers thought that one-day workshops would be ideal.

Three quarters of the teachers like the idea of the workshop series being spread out over the course of the year as this year's *Get Energized!* series was. Fourteen percent of them, however, thought that starting the series in the summer and then spreading the rest of the series throughout the school year was ideal. The ideas of fall only, spring only or summer only workshops were by far the least popular options with these teachers.

When asked about their preferred days for a workshop series, the most popular option was workshops on Fridays with substitute coverage. Workshops mixed between Fridays (with substitute coverage) and Saturdays (with stipends) were a closely popular second option. Workshops on Saturdays (with stipends) were by far the least popular option with these teachers.

Supply Bins

Almost all teachers (97%) used the bins of materials provided at the workshops. Ninety percent felt like there was just the right amount of supplies in each of the bins. Only eight percent indicated that there were not enough materials in the bins while only one person indicated that there were too many materials. However while most teachers reported using the materials during school year, many indicated that they will be better prepared and able to use them during the next school year. Comments concerning the supply bins included:

- *Absolutely! They were critical to making the lessons work and engaging the students!*
- *Why not? Everything is laid out and convenient, and I am VERY GRATEFUL for it! Otherwise, I would have to purchase these things out my personal budget, and that makes working on extensive projects prohibitive.*
- *Did not use all this year, but plan on using and replacing and reusing others next year.*

One suggestion for the next round of supply bins was to have a checklist attached to each of the bins and a list of the places from which the supplies could be purchased. For example:

- *I did use some of the materials. I wish I could have used more. I know that when I opened up some of the bins that I didn't know what the materials were for, and with the year being so crazy at times, I didn't want to look in my binder. I think it'd be helpful next year to include a list of what is included and what it's used for...making it easier to utilize.*
- *All the materials were there. They were very generous. I just wish each bin came with a checklist so that if there were items to reorder, you knew what exactly to get.*

Partner Teacher

Three quarters of the teachers said that their professional relationship with their partner teacher was stronger after attending the workshop series. One quarter said that their professional relationship was the same while none of the teachers said that their relationship had become weaker. Benefits of having a partner teacher included having someone that they knew at the workshop, having support at school for the activities and having someone to bounce ideas off of after the workshop. Example comments included:

- *Doing the experiments together at the school. Having a person there supporting these sometimes over the top experiments was important.*
- *Could bounce ideas off each other... share materials... could have someone to attend in my place when there was a conflict and I could not make it.*
- *I felt more comfortable asking my partner for help in other areas. I also was able to talk with my partner and become a little closer on a personal level.*
- *Needed someone to talk things over with.*

Three quarters of the teachers indicated that they would like to work with more than one teacher from their school in the workshop series. The primary reason for these responses included wanting to have a greater mass of teachers in their schools teaching this way. However, some of the teachers who indicated that they would like to have more than two teachers from their school mentioned that scheduling may make it difficult for this to happen. Those who did not want to work with more than one teacher thought that more than two people might make it difficult or might bring too many opinions or personalities into the process.

At the same time, a large majority of the teachers mentioned that they would still attend a workshop series with a partner teacher with 67% saying that they “absolutely would attend” without one. Only one teacher said that he or she “absolutely would not attend” without a partner teacher.

Principal Support

All of the teachers said that their principals supported them attending workshops on Fridays. The two main reasons given for this included 1) the Museum providing substitute coverage and 2) the principal looking favorably on professional development especially science professional development. Sample responses include:

- *He valued the opportunity for us to have some professional development in our content area.*
- *She knew how important it was to instruct a new teacher in science.*

One area in which a small number of teachers mentioned their principals being concerned involved the speed in which they were reimbursed for substitutes.

- *Yes (he was supportive), but would ask us frequently when he was going to get reimbursed.*

Despite having the support of their principals, only 19% indicated that their principal had seen them teach a lesson from the curriculum. Yet of the principals who had seen a lesson, teachers reported that the feedback was very positive. For example:

- *He was impressed, and impressed by how much the students seemed to know.*
- *Yes, he came to observe when we were doing some activities with electricity, and he was impressed with the students' ability to remain on task. The students were engaged and they were able to give the principal a lot of valuable feedback regarding the activity.*
- *She found it fascinating and was very happy that I was so energized to teach it.*
- *He liked what he saw. He also saw the Get Energized faculty teaching a lesson, and he was pleased.*

Site Visits

Most of the teachers in this survey (83%) had a site visit to their classroom. When asked about their perceptions of the purpose of the site visit, approximately half of the respondents felt like the purpose was for Museum staff to model inquiry or the lessons for the teacher participants. Most of the other respondents felt like the purposes were for the Museum to try the activities in a school setting or to see the schools in which they work. Comments included:

- *To support the teachers in the program, letting us know that activities can be done in the classroom during a 45-50 time frame. It was good that Mary demonstrated an activity, because it made me think that time is not against me.*
- *To strengthen our knowledge.*
- *To have the museum staff come in and lead a lesson with the students. I believe it was a modeling tool for the teachers, and it was also a way to be sure that the current students received a lesson from the program this year.*
- *Possibly to model a lesson for us and to make another connection between the school and the museum.*

Of those teachers who had a site visit, just over half believed that the site visit impacted their comfort level in teaching science. Forty-five percent, however, believed it did not. There appeared to be no relationship, however, between those who felt that there was no impact and their correct or incorrect perception of the purpose for the site visits.

For those who thought that the site visit impacted their comfort level positively, reasons given were that it gave them more confidence to see a lesson done with his or her students or reinforced what he or she was doing in the class already. Comments included:

- *My students showed they are very capable of following along in these lessons. Also, a very hands-on, possibly chaotic lesson was modeled step by step in the classroom. It made me confident that I can work with eggs and 4th graders.*
- *The site visit confirmed that I am doing the right things in terms of inquiry.*
- *It showed me that I was doing experiments right.*
- *After the activity, the students wanted to know why I have not done more of them. There was a little apprehension on my part because you want everything to go perfectly, even though you know that it does not always happen that way.*

In terms of what they would have changed about the site visits, the most common responses were the students' behavior during the visit and the length of the visit. Several teachers wished that the visit would have been longer. One teacher also mentioned that she or he would have liked to know the teacher's role during the visit. Example comments include:

- *I would have made my students behave better! :-)*
- *I wish the museum visitors could have stayed a little longer, but there's nothing I could have done about that...45 minutes is just too short for some of the lessons.*
- *Wish that there was more than one hands-on activity and more time.*

- *Have the MSI personnel let the teachers know how we can help facilitate the lesson. We were not sure how much she wanted to do and how much we should intervene. Just let us know the roles and responsibilities so we can have a smooth lesson.*

Future Professional Development

When asked how likely they would be to take another professional development workshop series offered by the Museum, all teachers indicated that it was very likely with 97% saying that they “absolutely would take” another workshop series. When asked if they would recommend *Get Energized!* to someone else, all teachers said that they would. Comments included:

- *It was great! I learned a lot, the time went by quickly, the employees were helpful, fun and stimulating, food was wonderful, supplies were nice, and the stipend was really appreciated as well.*
- *I already have teachers in mind for next year. I told them about the program and how much I think they would enjoy it.*
- *I loved it! It was the best experience of my first year teaching....It gave me hope for what teaching could be.*
- *I already have recommended it to every teacher I know!!!!*
- *The series was very teacher friendly. The Museum was extremely accommodating. I got excited about what we did there and wanted to take it back to my kids. The day went by very quickly. FREE STUFF!*

In looking at topics that they would like to see covered in future workshop series, the human body (89%) and Everyday Science/City Science (86%) were by far the most popular. Space was also popular with almost 70% of these participants. Energy 2 and Transportation were less popular (39% each) while World War II was the least popular topic with this audience (17%). Other suggested future topics included life science, Earth science, environmental issues, animals, genetics, and ecology.

Method Two: Post-series Focus Groups

DEMOGRAPHICS

Two focus groups were held with a total of eight of the TPDS teacher participants. Each of the groups contained an approximate even mix of teacher from the two TPDS cohorts (i.e. 4th-5th and 6th-8th). The majority of the participants were female and most teach in a variety of public schools. These demographics were intentionally sought for the focus groups in order to match the makeup of the TPDS series.

RESULTS

Overall Program Benefits and Challenges

The top reasons for applying to the program were an interest in the hands-on approach to the series or to motivate/rejuvenate the teacher around teaching in general or the topic of energy specifically. Yet when asked if they had an accurate understanding of the program to which they had applied, the consensus was no. These participants had not realized that so much would be covered during the series or that so many materials would be supplied as part of the program.

For the teachers in these focus groups, the greatest benefit of being a part of the TPDS program was the combination of the hands-on activities/content with the actual materials to implement them in the classroom. Many suggested that one would not have worked without the other and that this is often where they are frustrated with other professional development experiences. The other themes in terms of benefits were the commitment of the program staff and the creation of a group of teachers that stayed together throughout the course of the program.

The top challenges of being in the program included 1) time, 2) curriculum planning or constraints and 3) comfort with applying new teaching methods in their classrooms. In terms of time issues, many teachers felt that the pace of the workshops was challenging especially since there was often little time for reflection or processing of the activities that they just completed. Others found that although they wanted to take back what they were learning to their classrooms, they had already had to pre-plan their curriculum year or were working within a school system that had a pre-planned year. And finally, teachers mentioned how challenging it was to take the pedagogical methods that they were experiencing in the workshop and implement them in real classroom situations with real students. One suggestion was to have fewer activities in the workshops and instead dedicate more time for teachers to talk with each other about their successes and failures in implementing the pedagogy.

Content

Similar to the results from the online survey, both focus groups agreed that their content knowledge had increased as a result of the TPDS series and that their comfort sharing this content had increased. Many mentioned that the series had given them new information, resources, or made them think about the concept of energy in a new way (e.g. that sound or heat were a part of energy). A few mentioned that attending the workshops made them want to teach these topics, especially for some who had stayed away from these topics in the past.

Pedagogy

In talking about changes in pedagogy, teachers focused most of their comments on using inquiry in the classroom. Many expressed at least an attempt at using inquiry or inquiry resources more (e.g. the inquiry wheel) in their classrooms or a new confidence at trying this method with their students. At the same time, while many mentioned that they liked to do hands-on activities in the past, they enjoyed being exposed to a new set of activities from the program to use in their classrooms.

Museum Skills

Both groups of teachers expressed a greater comfort with the Museum of Science and Industry as a result of participating in the TPDS. Many mentioned that they did not even know the Learning Labs existed before they entered the program. Others mentioned feeling less overwhelmed entering the building or bringing students to visit.

Yet while comfort with the Museum seemed to increase, the consensus across groups in terms of comfort in using informal resources seemed to have stayed the same. Teachers mentioned that not knowing the staff at other places or not knowing the programs that are offered would make them not as likely to seek out other places to supplement what they were teaching. One teacher did mention however that having

been exposed the Museum staff made her “more adventurous” in reaching out to a bio-ethanol plant for a future class field trip.

Curriculum

Focus group participants seemed generally satisfied with the curriculum that was provided through the series. All had used it at some point in their classrooms. However, both groups mentioned that they had to adapt the curriculum for their students. Typical adaptations were to give their students less options (e.g. less materials to choose from or less questions to investigate) or to shorten the activities to fit within their class time constraints (i.e. less trials or shorten the worksheets).

For the most part, participants felt like the curriculum aligned with what they were teaching. Yet a few had to try to squeeze it in to an already mapped school year or use it as a supplement to the school assigned textbook that they were using. Having the lessons linked to State Standards was important since many are required to put this on their lesson plans.

Suggestions for what else they would like to see in the curriculum included the following:

- Suggestions for how to adapt the curriculum up or down depending on the audience.
- See the same experiment modeled twice within in the same workshop. One would be for an older audience and one would be for a younger audience. This would give teachers ideas of how to do it in their own classrooms.

Supply Bins

In terms of supply bins, focus group participants were typically satisfied and thankful for the materials. While many self-contained teachers thought there were enough supplies in the bins, departmentalized teachers struggled with only having enough supplies for one class of students. For the most part, teachers did not mind replenishing the supplies in the bin, but would like a list of where to purchase the items (e.g. Educational Innovations, Home Depot, Jewel etc.). One major suggestion for improving the bins was to include a list on the outside of the supply bin so that they would know where to find the materials, especially when materials are used across kits (e.g. wire cutters). Another suggestion was to include a master table of contents to help keep track of which activities were parts of which workshop and which supplies were in which supply bin.

Workshop Logistics

When asked about the logistical aspects of the TPDS series, focus group participants matched many of the themes in the results from the online survey. Teachers typically seemed to prefer Fridays but were not opposed to the time they spent at these workshops on Saturdays. Having the series spread out over the course of the year was preferred by far, yet there was some interest by members of both groups in having an introduction or overview of material (e.g. an extra day or two) prior to the school year. Participants also expressed openness to making the workshop days longer if that meant that the workshops would include more time for teachers to process what they learned or talk about topics that are key to their implementation (e.g. classroom management, assessment etc.).

Principal Support

In general, participants expressed that their principals were very supportive of their attending the TPDS and were open to them attending during the week. However, some participants expressed that Fridays are often when teachers are most likely to take personal days which makes it hard for teachers to be out for professional development. One suggestion was to hold the workshops on other days of the week to avoid this issue and to allow teachers to go back to the classroom the following day and implement what they learned in the workshop.

Partner Teacher

Both groups of teachers seemed to agree that there were benefits to having a partner teacher in the program. Common reasons included having support in their schools, someone to bounce ideas off of, or someone to share bin supplies with when they were short. One main drawback to having a partner teacher was if that teacher did not show up often or was not as involved in the program as his or her partner. This was frustrating to one teacher since she had to re-teach the workshop to her partner in order to implement in their shared classroom.

When asked about their thoughts on having a larger cohort of teachers from their school attend the workshop, both groups expressed that they thought it could be a good idea. Yet, teachers were quick to mention the drawbacks to this idea. For them, drawbacks included veteran teachers not being willing to participate, the inability of many teachers to be out of school at the same time, participants enjoying meeting teachers from other schools and sharing experiences, and not wanting to limit the number of schools that can participate in the program.

In terms of being a “veteran teacher” in the TPDS (i.e. past participants taking on more of an advanced role), teacher reaction was mixed. Some focus group participants were “thrilled” by the idea of helping out, liked the idea of being mixed in with teachers who were new to being in the series, and felt that one does not truly know something until one can teach it to someone else, especially a colleague. One key consensus by both groups was that they would only like to participate in this role if they were still learning something new themselves (e.g. learning a new content area or learning more activities related to energy). Neither group expressed interest in going through the same module that they had participated in this year.

Site Visits

Most of the focus group participants had site visits to their classrooms. When asked what they thought the purpose for the site visit was, the two key themes were 1) to model the activities for the TPDS teachers and 2) to allow Museum staff to be in real classrooms with real students doing the curriculum. Yet teachers in both groups discussed the challenges to participating in this year’s site visits. Many teachers expressed that they did not understand their role in the site visit, were unsure as to how to prepare their students before Museum staff arrived, and that there needed to be more than one person to facilitate the lesson (e.g. two Museum staff facilitators or one member of the Museum staff and the teacher).

When asked about a variety of other alternatives to the site visits as they were conducted this year, teachers had mixed feelings. Teachers seemed less open to being observed by Museum staff while they taught a curriculum lesson since classroom teachers already feel observed and watched much of the day.

However, they discussed the idea of team teaching a lesson with Museum staff in a positive way and thought this would be the best use of the time especially if there could be a debrief with staff at the end. One teacher recognized that this could be logistically difficult, however, due to the reality of the school day schedule and Museum staff time.

Field Trips

Because of time limitations, only one of the focus groups was asked about field trip logistics. Overall, these teachers seemed to have positive experiences on their trips. The free lab and the free bus were keys to making their trips a success as some teachers mentioned that they would not have been able to come without these provisions. Most of these teachers did not use the field trip to connect the Museum exhibits and the energy content they were learning in the workshops. Challenges to the field trips included many teachers having too many students for the amount of spaces in the labs and departmentalized teachers having issues taking their students out of school for an entire day. One suggestion for next year was to include an opportunity to book field trips during the workshops so that teachers would not have to do it on their own time.

Website

Teachers in both groups indicated that they were not regular users of the TPDS website. Many expressed that the major reasons for not using the website were difficulty with the functionality and the lack of incentive to go to it especially since much of the information was already in the workshop binders. Both groups mentioned that the idea of talking online with the community of teachers would be a positive thing. One suggestion from both groups was to set up a Yahoo group or listserv since the postings would go directly to their email. Another suggestion was to have an e-newsletter between workshops that would remind them or give them reason to visit the TPDS site.

Expectations

Overall, both groups agreed that the TPDS program had far exceeded their expectations. Based on their positive experiences, however, teachers left with the following questions for the TPDS team:

- What resources will be available for me now that I am not a part of the program?
- How do I find certain supply bin materials?
- What resource will I have available to me at the Museum?
- Will I still be a part of the community?
- Will I still be connected? Have support?
- Will there be other content areas?
- What are the chances of being a part of the program next year?

THE TPDS STAFF EXPERIENCE

Method Three: Post-series Staff Debrief

DEMOGRAPHICS

In addition to soliciting feedback from participants in the TPDS, Evaluation staff sought to capture feedback from the four facilitators who implemented aspects of this new Museum initiative. Topics covered in this session emphasized the implementation perspective of the same topics discussed by the teachers in both the online survey and the focus groups (e.g. curriculum, workshops, site visits etc.).

RESULTS

Overall Implementation Benefits and Challenges

From an implementation standpoint, the greatest benefits of the program were 1) building relationships with teachers over the course of the year, 2) developing and implementing a program this large and intense for the first time (e.g. number of participants, number of workshops, amount of supplies provided) and 3) learning to evaluate themselves as adult educators and professional development providers.

On the other hand, the top challenges to implementing the TPDS were two-fold. One primary challenge revolved around time pressure. More specifically, this included the limited time to develop curriculum between workshops, the lack of time to prototype activities with actual students, the lack of time during workshop days to cover all topics, and the amount of time it took to navigate the Chicago Public School system during the school year. Outside of various time pressures, the other key challenge to the TPDS program was creating and maintaining real relationships with the sixty-four participants and meeting their individual needs and requests. Staff members recognized that this is a very important to the success of the program over time and see the need to be continually mindful of this area.

Content

In terms of the content goal of the program, the Teacher Programs team felt like the *Get Energized!* module accomplished this goal especially for the first year of the program. Yet since evaluation focused on the formative development of the workshops and curriculum, the team recognized that this goal was not meant to be directly assessed in the first year. As the *Get Energized!* module moves into the pilot phase during the 2007-08 school year, the team would like to focus on more carefully assessing participants' change in content knowledge through engaging in the program.

Pedagogy

In terms of change in pedagogy, the Teacher Programs team again felt satisfied in meeting this goal for the first year of the program. Again, while the formative evaluation methodology made it difficult to assess this aspect of the program during the first year, team members felt like the increasing development of conversation about different teaching methods (i.e. demonstration vs. hands-on vs. inquiry) in the workshops pointed to a base level of success in this area. Again, the team expresses an interest in more carefully assessing this area in the upcoming pilot phase of the program.

Museum Skills

While the team discussed basic success with the first two major goals of the program, they felt like change in Museum Skills was an area that definitely could be better defined and emphasized during the

next iteration of the *Get Energized!* module. While this goal seems straightforward, team members agreed that the concept of a “Museum Skill” needed to be better defined by them and then infused more into the workshops and the curriculum itself. Once this is done, the team would like to see how an increased emphasis on this area impacts the comfort of the participants in the program.

Curriculum

From a curriculum development standpoint, the team was generally satisfied with the first version of the module curriculum and would like to continue adapting and developing curriculum themselves for future program modules. The common reason for this was that by developing their own lessons, they were truly thinking through and researching the topics that they were undertaking in the workshops. By developing the lessons, team members felt like they were creating a better overall professional development product. Challenges to creating their own curriculum included dealing with time pressures, developing one curriculum for teachers with students of varying ages and ability levels, and infusing aspects of Museum Skills into the lessons.

In terms of changes to the curriculum for next year, the team would like to revisit the length of the curriculum, take the time to test all of the activities with students, reevaluate some of the supplies in the bins, and think about how the lessons could be set up or arranged differently to better scaffold the content topic for both teachers and their students.

Workshops

In terms of the workshops, the team felt like these were a central aspect of the program. Although developing and implementing the workshops could be time consuming, the workshops provided staff with the chance to spend real time with the teachers both teaching them and learning about their experiences in the classroom. The workshops were also a key point to pass on activities and supplies that were really important to the participants of the program. The main challenges for staff in terms of the workshops were 1) struggling how to balance content and pedagogy in the workshops and 2) determining what to actually cover in the workshop days.

In terms of what staff would like to change for next year, common themes were 1) to lessen the amount of activities and content and instead include more time for reflection and processing, 2) to expose the teachers to more of the activities in the curriculum possibly through a demo hour, and 3) to make a better effort to start on-time and therefore maximize the time that the team has with the teachers.

Supply Bins

Similar to the workshop sessions, the team felt like the inclusion of the supply bins was a vital aspect to the success of the program during the first year. The team agreed that most of the teachers would not be able to implement the curriculum from the workshops without the supplies to do it. Yet while the team saw the benefits of including supply bins, there were major challenges to doing this based on the sheer amount of supplies that had to be ordered, organized and distributed. Developing an inventory system, having a dedicated space to organize and distribute, and refining the process of ordering from various suppliers will be key to simplifying this aspect of the program in future years.

Principal Support

Recognizing principal support as an important part of the program, the team identified this as an area in which to focus more staff energy during the upcoming school year. During this first year, staff had virtually no contact with the principal after the teachers' application process. Yet since support from the principal is related to a teacher's ability to take part in the program, the team felt like building these relationships in schools throughout the school year could be key. Suggestions for the future included sending follow-up communication once a teacher has completed a program module as well as a mid-year letter with highlights of what their teachers had been doing in the program so far.

Site Visits

In terms of the site visit aspect of the program, the team reported struggling on various levels with implementation. Site visits proved time intensive for the size of the staff and logistically difficult to schedule and reschedule based on teachers' time. While the staff saw a great benefit in going out to the schools (i.e. seeing the curriculum in action and spending time in teachers' classrooms), the original purpose of the site visits (i.e. to model content and pedagogy for the participant teachers) was often not communicated clearly and led to confusion over whether the Museum wanted to model the curriculum or test the activities with students in the classroom. The teacher participant's role in the actual site visit was often not clearly defined either.

The team indicated that further discussions were needed to decide if site visits as they were implemented this year should remain a part of the program. If the team decides to keep this aspect of the program, staff suggestions for improvement included better defining and communicating the purpose of the site visit, prototyping the activities before going out to the schools on the site visits, and making clear rules concerning the logistics of scheduling site visits. As the program continues to grow, the level of staff needed to sustain this aspect of the program should be seriously considered.

Expectations and Future of the Program

As a whole, the team developing and facilitating the TPDS felt like the first year of the program met their implementation expectations. At the same time, they reported being very aware that the program was far from complete and saw the areas in which the program could continue to grow and improve for the following years. In terms of where they would like to see the program go, team members felt like continuing to develop, nurture and maintain the relationships with current and future TPDS teachers was a key priority. Other thoughts included targeting certain schools or more teachers from the currently involved schools to truly affect widespread change in content level, pedagogy and museum skills.

In terms of the major lessons that they learned as program implementers in this first year, team members included the following:

- Seeing the importance of institutional support on all levels.
- Learning about the culture and makeup of the Chicago Public Schools.
- Better understanding some of the individual struggles that teachers have everyday and the positive and negative ways they adapt to these struggles.
- Learning how important it is as informal educators to be advocates for teacher participants and their needs in the classroom.

- Gaining experience on what it is like to be in the classroom and the classroom management issues that are at hand when teaching in new ways.

DISCUSSION AND RECOMMENDATIONS

Overall, the first year of the Teacher Professional Development Series and the *Get Energized!* module were successful. Both participants and staff of the program were satisfied with the program and the participants' expectations were exceeded on various levels. All teachers who responded to the online survey indicated that they would recommend the program to others.

The overall goals of the program (i.e. Change in Teacher Content Knowledge, Change in Teacher Pedagogy, and Change in Teacher Museum Skills) were met on a basic level. The overwhelming majority of teachers indicated improving their basic energy content knowledge and improving their comfort applying the content in their classrooms. At the same time, many indicated attempting to use various teaching strategies in their classrooms or using these strategies in new ways. And finally, many of the participants in this evaluation experienced an increased comfort with the Museum although not necessarily with other informal resources.

Although the program was initially well-received, both participants and staff facilitators had numerous suggestions for improving the program for the future. Based on the analysis of this feedback, the following is recommended:

- Continue implementing, refining and growing the TPDS series based on the model that was tested this year. Teachers were overwhelmingly satisfied with the program and it far exceeded the expectations of most teachers.
- Continue developing curriculum for the modules. At the same time, staff may want to actively track the number of lessons teachers are actually using from each of the units and/or expose them to more lessons throughout the workshops (e.g. through a demonstration hour).
- Explore the idea of hosting workshops on other days of the week. Saturdays seemed to be acceptable to most participants but keeping them to a minimum is recommended.
- Consider having an overview day at the end of the summer to allow teachers to start planning to use the curriculum in some way over the course of the year.
- Allow more time for reflection and processing in the workshop days and for teachers to share their experiences with one another. Consider lengthening the workshop day to accommodate this.
- Continue to provide the supply bins as part of the program. The connection of modeling the activities and content with having the materials right at hand seem to be the key to the program and distinguish the TPDS from other professional development experiences.
- Keep the idea of partner teachers but consider mixing them up throughout the workshop days so that they get to work more with other teachers.
- Explore the concept of having a "teacher cohort" from each school, but possibly spread them out throughout the modules instead of concentrating them to one module. This may be done by approaching the principal or by recruiting new teachers through the teachers that have already attended the program.

- Pilot test the idea of having “veteran teachers” in the next module leading portions of the activities or reflection exercises. Some of the teachers were very excited about the idea of taking on a more active role; however, giving them extra to do or not giving them the chance to learn something new could be downfalls to this idea.
- Establish more contact with the principals. For the most part, teachers felt that their principals were open to professional development and open to them attending the TPDS series. Communicating with them more may create a stronger TPDS presence in the school, create more support for TPDS teachers within their schools, and make it easier to recruit more teachers from those schools in the future.
- Actively define and clarify the purpose of site visits. Teachers seemed to like having the Museum staff come out to their classroom but were often unsure of their role. Teachers seemed open to having a lesson modeled for them but were often interested in figuring out a way to co-teach a lesson with Museum staff.
- Keep the free bus and learning labs as part of the field trip experience. These aspects were key to many of the teachers being able to bring their students to the Museum. Consider options for departmentalized teachers who have more students than are allowed by current bus or lab space restrictions.
- Refine the website to make it more user-friendly or develop more of a listserv for teachers to more actively engage with one another or the staff from the program. Teachers wanted to share their questions and experiences, but felt the website was currently not meeting their needs to do this.
- Continue to stress content and pedagogy as part of the series. Teachers gained knowledge and comfort in both of these areas throughout the series. Although staff struggled often on where to focus their energies in these areas, participants saw both areas as key to their success in the program.
- Incorporate more on Museum Skills into the workshops and curriculum. Although participants experienced a greater comfort with using the Museum of Science and Industry, their comfort with informal resources in general did not seem to change much through participating in this program.
- Consider adding more staff to the program to keep it sustainable and meaningful to the teachers who are past and current members of the TPDS series. Consider ways to continue connecting with teachers in a one-on-one way and having meaningful interactions especially if changing behavior (i.e. change in pedagogy or teaching practices) remains a primary goal.
- Develop a way for teachers to remain a part of the program after going through their module. Many teachers expressed wanting to take part in another module. Others just wanted to have access to the community of teachers that were a part of their module. Having a listserv was one suggestion to allow the community to live on or grow with minimal support needed from the Museum.

NEXT STEPS

After gathering this information, the Teacher Programs team should continue to develop the next module of the TPDS series, *City Science*, while refining and implementing the *Get Energized!* module.

Evaluation staff should continue to work with Teacher Programs staff to pilot the *Get Energized!* module focusing on how well this module is accomplishing the three main goals of the program. With the logistics of the module more securely in place, staff should concentrate on prototyping and polishing up the curriculum activities by testing them with students. If Teacher Programs staff plans to further investigate the idea of “veteran teachers” or “teacher cohorts,” the purpose and goals of these initiatives should be clearly defined and the results of these pilots tracked by Evaluation staff.

At the same time, Evaluation and Teacher Programs staff should develop an intensive formative evaluation plan to assess *City Science*.