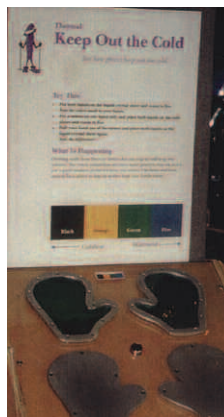


Teaming Up:

Ten Years of the TEAMS Exhibition Collaborative

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InformalScience.org/Tools/Reports



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SECTION 1

Introduction and History of the TEAMS Collaborative

PURPOSE AND APPROACH OF THE MONOGRAPH

This monograph has been created by the TEAMS (Traveling Exhibits At Museums of Science) Collaborative, a group of seven small U.S. science centers, to share experiences, observations, and lessons learned with the broader science museum field. Our intention is to help others who might be interested in forming a collaborative to work through some key issues, most of which have to do with the relationships between collaborative members, rather than more technical matters. We hope that this will provide a vision for others as to how collaboration among science centers can work.

The monograph looks at intellectual issues related to the design of collaboratives, as well as policy implications related to the costs and benefits of a collaborative as an investment in museum capacity. In addition, we touch on a broad spectrum of practical day-to-day issues related to exhibition collaboratives, ranging from policy implications to photo documentation.

To this purpose, we provide descriptions of a series of lessons learned (see the Summary in Section 2) that we hope will prove useful to others embarking on a collaborative exhibition development project. Additionally, we have included a collection of essential documents (see the Appendixes in Section 8) that will help to facilitate the collaborative process. For the convenience of users, these documents are provided in an electronic form suitable for modification and use by others.

This monograph is not, however, intended as a “how-to” guide. While we do include a series of appendixes with technical information, we do not provide an exhaustive checklist of technical items or a list of criteria for collaboration; such lists can be found in a wide variety of other publications. We reference several publications in the annotated bibliography in Section 7 that provide excellent resources of this kind.

When referring to ourselves, we use the terms “science center,” “science museum,” and “museum” somewhat interchangeably throughout. While we believe that science centers are in many ways fundamentally different from other types of museums (for example, placing far less emphasis on the collection and display of objects of historical or scientific value), we also recognize that there are many other types of organizations working together on exhibitions, for

whom the information given here might be applicable. These include children’s museums, aquaria, zoos, and botanical gardens. With this recognition in mind, we have tried to remain as general as possible in our museum terminology.

Our approach is largely conversational and reflects our experiences during the past ten years, from before the first grant proposal through the first year of our third four-year grant from the National Science Foundation. The experiences reported were elicited and recorded largely by Inverness Research Associates, the independent evaluators who have been part of the TEAMS Collaborative since its inception.

OVERVIEW OF THE TEAMS COLLABORATIVE

The TEAMS Collaborative first assembled in 1995 as a group of five small science centers with National Science Foundation funding. TEAMS has had a total of three 4-year rounds of funding from the National Science Foundation. Professional development was a key element in each and took the form of workshops in formative evaluation, exhibit design charrettes, and workshops on broader topics such as family learning in museums (TEAMS 1) and universal design of exhibits and programs (TEAMS 2).

Our first project, TEAMS 1, was to build and circulate 1,500-square-foot traveling exhibitions and associated educational programs dealing with various topics in science.

For TEAMS 2, three additional museums joined the Collaborative, each working with a mentor museum to develop their exhibition design capabilities more fully. One of the original five museums was deeply involved in a major building expansion at the time and therefore unable to continue after the first round, leaving seven participating museums.

TEAMS 3 has added a research component, with the goal of looking for ways to improve conversations between youthful museum visitors and their adult caregivers at science exhibits.

Some key features of the TEAMS Collaborative include:

- All exhibitions are 1,500-square-feet. They can be on any topic of science or math
- All exhibitions initially circulate within the Collaborative on a common schedule at no charge; shipping is split equally between Collaborative members.
- Each exhibition is accompanied by a set of educational programs, with activities for family science events, a teacher guide, an explainer guide, and a take-home family activity brochure.

- Following circulation among the Collaborative, the exhibitions go on a national tour of science and children's museums.
- TEAMS follows a "shared vision, distributed leadership" model in which the chair of the Collaborative is at an institution different from that of the administrative/financial manager.
- Inverness Research Associates, the external evaluator for TEAMS, works to assess both the individual exhibition projects as well as the success of the Collaborative itself. Their involvement ranges from initial planning to professional development workshops, formative evaluation, and summative evaluation.

GOALS OF THE COLLABORATIVE

In assembling the museum of the TEAMS Collaborative, the initial group of directors had four primary goals in mind:

1. *Provide high-quality science exhibits for small museums.* At the time the Collaborative was formed, relatively few high-quality interactive exhibitions were for rent at U.S. science centers. A key goal was to increase the inventory of exhibitions in the 1,500-square-foot range that would be affordable to small museums, which are frequently unable to rent the larger exhibitions produced by most museums.
2. *Build institutional capacity.* Small museums commonly have only one or two exhibit staff members. Because these staff members often start out with little training in the museum world, small museums can be at a distinct disadvantage with respect to creating high-quality exhibitions. The TEAMS Collaborative was created in part to build the capacity of small museums to generate interactive exhibitions that would go through the same prototyping and evaluation processes and filters as exhibitions from larger museums. This process would involve working with the museums to build capacity in a variety of areas: exhibits, education, evaluation, and marketing.
3. *Provide opportunities for staff development.* In most cases, small museums do not have the resources to enable staff to take advantage of major training opportunities. The TEAMS Collaborative therefore built into its grants the funding for staff to participate in meetings, workshops, and charrettes, many of which included nationally recognized museum professionals and leaders in related fields.
4. *Contribute lessons learned to the museum field.* From the beginning, the TEAMS Collaborative has made dissemination of its observations and findings a key priority. This monograph is the culmination of a large number of discussions, interviews, workshops, and meetings on the topic of collaboration. Other interim findings have been shared with the field through presentations at conferences, publications, and posting of information on the Internet. In addition, TEAMS Collaborative members have shared their experiences with countless other museums through information requests as well as application of knowledge while participating in collaborative ventures with these museums.

Although TEAMS was primarily concerned with fulfilling the goals above, perhaps one of the most significant benefits to the individual staff associated with TEAMS was a positive experience in collaboration, some elements of which would turn out to be transferable in a wide range of other settings and situations.

Although they did not realize it at the time, the commitments made by the originating directors were to have a disproportionately large impact on all of their institutions, due to their relatively small size. Significant intangible benefits unfolded over time as each museum gained thinking partners and a group of helpful resources in a wide variety of areas not covered by the Collaborative. These areas included institutional and strategic planning, financial management, fundraising, gift shop management, human resources, and many others.

One of the goals for this monograph is to document the TEAMS model as an efficient and effective way for the U.S. Congress to build the capacity of high-quality institutions in smaller cities and rural areas. Sustainability has never been a significant goal of TEAMS. While many of the members of the collaborative have raised additional funds to fully support their exhibition projects, the group has not focused on developing alternative sources of funding to sustain itself after the completion of federal grants.

ACKNOWLEDGMENTS

The members of the TEAMS Collaborative exist in large part because of the relationship each of us has with our local community. As seven science centers in seven communities, we are grateful for our members, visitors, and communities—each with a need for engaging and accessible exhibitions—who have helped us improve our exhibits and programs over time through partnerships and effective feedback.

We would like to thank the National Science Foundation and its program officers Barbara Butler, Barry Van Deman, Orrin Shane, and Dave Ucko, without whose support the Collaborative would not have been possible. Cynthia Yao and Bob Russell were both instrumental in helping to formulate the structure of TEAMS and in encouraging the group to move ahead with an initial funding request. We also thank the Association of Science-Technology Centers (ASTC), who, through its staff, board, leadership in the field, and traveling exhibition service, have helped and encouraged the Collaborative throughout its existence.

A HISTORY OF TEAMS

The following is a brief historical sketch of the TEAMS Collaborative. Rather than attempting an exhaustive overview, we focus on several key activities and events that have punctuated the life of the Collaborative. In most cases, we highlight lessons learned for consideration by others forming similar collaboratives.

* * * * *

The initial idea for TEAMS came from a chance meeting between Charlie Trautmann of the Sciencenter of Ithaca, NY and Cynthia Yao of the Ann Arbor Hands-On Museum while both were attending a National Science Foundation proposal writing workshop in Washington in December 1994. At the workshop, Trautmann learned that a recently submitted preliminary proposal from the Sciencenter for an exhibition on math (later to be developed as "FUN, 2, 3, 4: all about a number of things!") had just been rejected. Yao had ideas about an NSF proposal but realized that going it alone as a small museum was risky, since NSF funding was typically garnered by larger museums with proven track records involving funding, as well as staff members skilled in proposal writing.

Talking casually over dinner, the two realized that they shared a strong passion for creating interactive exhibits and for collaborating. They reasoned that, through a collaborative, small museums such as theirs might have a better chance of winning NSF support. They invited former NSF program officer Bob Russell, who had just made a presentation at the workshop, to meet with them the following morning to discuss options. Russell provided useful suggestions and encouraged Trautmann and Yao to continue with their plan of forming a collaborative of small science centers.

The idea germinated and took root. In retrospect, this was in large part because the two directors were looking for an opportunity to collaborate with other

museums as well as to get funding for their specific projects.

During their early meetings, they decided to invite three colleagues from other small museums to join them, each of whom had previously expressed interest in collaboration. These were: Mark Sinclair (Catawba Science Center, Hickory, NC); Sarah Wolf (Discovery Center Museum, Rockford, IL); and David Goudy (Montshire Museum of Science, Norwich, VT). These five directors became the core of the TEAMS 1 Collaborative.

The new collaborative group convened several planning meetings. The first was held in Ann Arbor, MI and laid the foundation for the project: a collaborative in which each museum would create a traveling exhibition, with accompanying educational programs. Bob Russell attended and helped the group define itself and its goals.

Because David Goudy, director of the Montshire Museum of Science, was unable to attend this first meeting, the group decided to hold the second meeting at Montshire. Though they lacked a travel budget, and Montshire was the least central location, the group felt that hosting the next planning meeting there would foster a sense of inclusion and buy-in, both of which were considered critical to success of the venture.

Russell worked with the group, helping specifically with planning and proposal writing. A key recommendation, based on his experience as a program officer at the NSF, was to incorporate some element of learning that would advance the field of small science centers, in addition to developing five high-quality traveling exhibitions on unrelated topics of science or mathematics. The group decided to study the current knowledge associated with family learning in museums and attempt to apply that knowledge to the exhibitions it was producing. This idea of emphasizing some form of strategic impact on the field of informal science worked well, and the Collaborative proposal to the NSF was approved on its first submission.

Having secured funding, the TEAMS 1 Collaborative was moderately successful, with each of the five founding members producing a traveling exhibition that circulated initially among the Collaborative. Of the five, three exhibitions were considered sufficiently robust to tour nationally through the ASTC's Traveling Exhibition Service. The group learned many things about communication, staff turnover, shared expectations, and the importance of design guidelines. Each of these issues is discussed in more detail further on in this monograph.

A number of factors led to the successes of TEAMS 1. First, the group's formation owed as much to the fact that the five directors enjoyed working together

as to each having a project that needed collaboration in order to get funded. Second, the group took its time (11 months) to develop the relationships and the proposal. Third, the group separated the functions of Collaborative Chair (Trautmann at the Sciencenter) and Treasurer/NSF Prime Contractor (Goudy at the Montshire Museum of Science) to provide a system of checks and balances. Fourth, each museum took an active role in the Collaborative: Catawba managed the tour, Montshire handled financial matters, the Discovery Center Museum facilitated the production of marketing materials, etc., so that each museum written into the project had a specific task to ensure engagement.

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Although there were difficulties during TEAMS 1, the group felt that the benefits of collaboration clearly outweighed the costs and decided to attempt another round of funding. Moreover, the group also knew that because the NSF does not fund ongoing operational expenses, TEAMS 2 would have to innovate in some way rather than simply continue building more exhibitions. Again, the group decided that it would need to demonstrate the potential for some sort of strategic impact on the museum field to win renewed funding.

The group selected the topic of universal design as the focal point of TEAMS 2, proposing to hold workshops for training and capacity building for staff at member museums as well as other interested museums. In addition, the group made a major change in structure, with three of the original museums taking on a partner museum for which it would agree to serve as an institutional mentor in the development of high-quality interactive exhibitions. These two key aspects of TEAMS 2, the focus on universal design and the mentoring of three additional small museums, resonated with reviewers. Again the NSF proposal was funded on its first submission.

The criteria for the new member museums were that they had to be:

- enthusiastic and eager to learn about building interactive exhibits
- small (budgets below \$1.5 million for museum operations)
- within a two-hour drive of their partners so that staff could interact regularly and share exhibit prototyping

We believe that being clear about the three criteria used to select partners went a long way toward ensuring engagement and good working relationships throughout the project.

Catawba Science Center took on The Health Adventure of Asheville, NC as its partner museum.

The Discovery Center Museum took on the Family Museum of Arts and Science in Bettendorf, IA. The Sciencenter took on the Rochester Museum & Science Center (RMSC) of Rochester, NY. Even though RMSC was considerably larger than all of the other museums, it was newly and actively pursuing a strategy to learn how to create interactive science exhibits after nearly a century of focus on collections and natural history displays.

Montshire was unable to find a suitable partner within the desirable geographic range, and so it continued its exhibit development program solo. Ann Arbor Hands-On Museum, fully engaged with a major campaign and four-fold expansion during the proposal stage, did not participate in the second round.

Overall, selecting new Collaborative members turned out to be highly important, and all three additions to the Collaborative quickly showed that they were in it to learn and to get better at producing interactive exhibitions. The group bonded quickly. Despite periodic disagreements among the partners regarding timing, quality, and cost, the directors continued to maintain a big-picture vision for their staff members. This allowed the entire Collaborative to succeed in completing two copies each of four 1,500-square-foot exhibitions, all of which, in contract with TEAMS 1, were travel-ready upon completion.

As in TEAMS 1, the TEAMS 2 Collaborative relied heavily on its external evaluator, Inverness Research Associates. Inverness served as a critical friend who could play the dual role of reminding each member museum of schedule and quality issues needing attention and helping to recognize and celebrate successes. Perhaps most importantly, Inverness maintained a position of advocating for the visitor, a perspective that continually reminded staff of the real reason for its efforts.

One of the key goals of the National Science Foundation was to document lessons learned that might serve others in the larger science museum field. As part of this overall effort, the Collaborative sponsored two additional activities through a supplemental NSF grant.

First, all TEAMS staff had the opportunity to document their experiences in the Collaborative through a written essay and earn a \$500 stipend. The essays contributed during this activity are presented in Section 5.

Second, the Collaborative sponsored a travel grant program, whereby staff could visit other TEAMS museums and witness methods, operations, and approaches to hands-on science exhibits and programs first-hand. The travel grant program was highly successful, and nearly all museums in the Collaborative took part. The following quote, following

a TEAMS museum visit, is typical of the experiences of staff members;

"I would say I did everything I had in my travel-grant proposal. My goal was to go to these two museums and get *Cool Moves* (an exhibition created by the Sciencenter/RMSC partnership) programming ideas and seeing programming in action. I did that, but over and above that I had a lot of great experiences going and seeing staff interact, and seeing staff and volunteers interact, and getting photos and activity ideas. Half was *Cool Moves*-based and the other half was checking out the museum. I was glad to bring back a lot of photos and show everyone at my museum ideas for exhibits. Some of the other staff here knew about some of the exhibits they had in Ithaca, so they suggested things to look for and bring back."

* * * * *

During the third year of the TEAMS 2 grant, the seven directors convened to assess their experiences working together and to decide if they should try for a third round of NSF funding. This time, the group was unanimous from the start in favor of continuing the Collaborative. The main issue, then, was to find an issue of substantial interest to the field of informal science education that would serve as the group's strategic focus for its proposal. Many months of discussion, conference calls, and Internet chat sessions ensued.

Finally, it was David Goudy, attending an ASTC session on learning in museums, who discovered the seed of an idea that formed the theme of TEAMS 3. Goudy pursued the idea of researching how children and adults interact while encountering science museum exhibits. He contacted some of the individuals involved in the ASTC session he had attended. Although very busy, one key researcher was serendipitously working with a former intern from the Montshire Museum and was pleased to discuss research options. The third TEAMS proposal to NSF focused on researching ways to increase the depth of adult-child conversations about science at museum exhibits, and was funded on its initial submittal.

* * * * *

As will be clear from the sections that follow, the TEAMS Collaborative has had a major positive impact on all of its members over the past decade. One of the key ingredients for this growth and positive change has been a willingness on the part of all TEAMS members to learn and change. Integral to this perspective is the fact that because the museums of

TEAMS are small, the institutional impact of these changes has been very large.

At the time of this writing, the TEAMS 3 Collaborative was in the first year of a four-year grant. The four museum partnerships are each developing a 1,500-square-foot exhibition, and a research team, working primarily at the Montshire Museum of Science, is developing tools for science museums to use in fostering deeper conversations about science among children and adult visitors.

5 A ROADMAP OF THE MONOGRAPH

Following this introductory section, Section 2 provides a summary of key observations and lessons learned.

Section 3 is a roundtable discussion among the seven directors of the TEAMS Collaborative that touches on issues of leadership, management, and other matters involved in overseeing a collaborative.

Section 4 summarizes a focus group of non-TEAMS museum professionals with significant experience in leading exhibit-based collaboratives. These six individuals provide further insights that will be of interest to anyone starting a collaborative.

Section 5 presents a set of essays written by staff members of the TEAMS museums. These essays discuss topics ranging from leadership to the nuts and bolts; collectively, they represent a comprehensive top-to-bottom look inside the daily activities of a working collaborative.

Section 6 is a policy brief that provides a number of observations on the value of the TEAMS model and specific experience as a strategic investment in developing the capacity of small science centers in the U.S.

Section 7 is a short annotated bibliography of helpful publications related to collaboration.

Section 8 presents a series of Appendixes containing the ideas, concepts, bylaws, working agreements, contracts, and other documentation of TEAMS in a form that can be easily modified for use by other collaboratives.

SECTION 2

Summary

INTRODUCTION

This monograph was written to share with the museum field some of the techniques used and developed by the TEAMS (Traveling Exhibits At Museums of Science) Collaborative. Rather than being organized according to a general set of “how-to” principles on collaboration, many which can be found in existing publications on starting and managing a collaborative (see the annotated bibliography in Section 7), this report drills down into the key aspects of leadership, staff interactions, communications, technology, and evaluation that influence success or failure in a museum exhibition collaborative.

The TEAMS Collaborative received its first grant in 1996 and has had a total of three 4-year rounds of funding from the National Science foundation to create a series of thirteen different 1,500-square-foot traveling exhibitions and associated educational programs and marketing materials. During the past decade, the Collaborative has experimented with internal organization, communication, technology, and other structural and support concepts. Our experiences and the observations of others are documented through the conversational format that was used to elicit them.

The report and this summary are organized around and summarize the perspectives of:

- directors of TEAMS museums
- leaders of outside collaboratives
- staff of TEAMS museums
- external evaluators

An Appendix in Section 8 contains many of the Collaborative’s important documents, including sample contracts, design principles, checklists, bylaws, and other items that can be downloaded and modified for use by others.

To understand the TEAMS Collaborative, it is useful to first understand its goals and the way the collaborative was set up and managed.

GOALS OF THE COLLABORATIVE

In assembling the museum of the TEAMS Collaborative, the initial group of directors had four primary goals in mind (details for each can be found in Section 1):

1. Provide high-quality science exhibits for small museums.
2. Build institutional capacity.
3. Provide opportunities for staff development.

4. Contribute lessons learned to the museum field.

STRUCTURE OF THE COLLABORATIVE

The TEAMS Collaborative first assembled in 1995 as a group of five small science centers with National Science Foundation funding. It began its first project, to build and circulate five 1,500-square-foot traveling exhibitions and associated educational programs on various topics in science, in October 1996. Professional development was a key element and took the form of workshops in formative evaluation, exhibit design charrettes, and workshops on broader topics such as family learning in museums (TEAMS1) and universal design of exhibits and programs (TEAMS 2).

In TEAMS 2, the Collaborative’s second project, three additional museums joined, each working with a mentor museum to develop their exhibition design capabilities more fully. One of the original five museums, deeply involved in a major building expansion, was unable to continue after the first round, leaving seven participating museums. Significantly, three of the four remaining original museums took on a partner museum, located within a two-hour drive, and served as a mentor during TEAMS 2 with the goal of increasing the capacity of the new partners to develop interactive exhibitions. TEAMS 2 developed two copies each of four new 1,500-square-foot traveling exhibitions.

TEAMS 3 has added a research component, with the goal of looking for ways to improve the conversations between young museum visitors and their adult caregivers while visiting science exhibits. Again, the Collaborative will complete two copies each of four new 1,500-square-foot traveling exhibitions.

Some key features of the TEAMS Collaborative include:

- All exhibitions are 1,500-square-feet in nominal size and can be on any topic of science or math.
- All exhibitions initially circulate internal to the Collaborative on a common schedule at no charge; shipping is split equally between Collaborative members.
- Each exhibition is accompanied by a set of educational programs, with activities for family science events, a teacher guide, an explainer guide, and a take-home family activity brochure.
- Exhibitions go on a national tour of science and children’s museums following circulation among Collaborative members.
- TEAMS follows a “shared vision, distributed leadership” model in which the chair of the Collaborative is at an institution different from that of the administrative/financial manager.

- Inverness Research Associates, the external evaluator for TEAMS, works to assess both the individual exhibition projects as well as the success of the Collaborative itself. Their involvement ranges from initial planning to professional development workshops, formative evaluation, and summative evaluation.

THE DIRECTOR PERSPECTIVE: A ROUNDTABLE DISCUSSION OF TEAMS DIRECTORS

In 2003, Inverness Research Associates convened a roundtable discussion of TEAMS directors to gain their impressions on various aspects of the Collaborative. Several key themes and observations from this discussion are summarized below.

Benefits of a collaborative approach for small museums

- At small museums, departments are small (often only one exhibit staff member) and interactions with other exhibit professionals may be rare. Therefore, a collaborative provides a forum for such interaction.
- Small museums have the advantage that they are often closer to their local communities than large museums; as a group, they are diverse and when they join together in a collaborative, they gain access from each other to a variety of tools needed to develop successful exhibits.
- Because of similarities between small museums in terms of both size and concerns, a collaborative can become a learning community for directors of small museums in which they can support each other on a variety of issues—involving the collaborative itself as well as other work.
- Joining together through a collaborative can provide the critical mass necessary for small museums to gain access to resources such as grants from the National Science Foundation.
- A grant such as TEAMS can have a large impact on a small institution when the grant becomes a significant percentage of the institution's overall project work.

Engagement in the work of the collaborative

- Shared work is important for engagement; shared accountability and creating the collective reputation of the collaborative are part of the shared work.
- It is important to know collaborative partners well, and to get to know them before agreeing to work with them. It shouldn't be necessary, and may be counterproductive, to cajole another

organization into a partnership—all partners must be eager to participate fully in order for the partnership to work well.

Dynamics of the collaborative

- In making decisions at the collaborative level, there is a need for directors to trust one another, as everyone cannot be involved in every decision. It helps to list, discuss, and agree on the principles that will guide the work of the collaborative and select partners who: 1) have a similar vision, and 2) are eager to share and help meet shared goals.
- It takes time and the right mechanisms to get past the language of guiding principles and reach truly common ground. Different people can assign different meanings and different priorities to the same words.
- Long-term collaboration with stable leadership has major advantages over short-term, one-time partnerships; personal dynamics and issues of trust can be worked out, leading to relationships that are built to last and make work flow more smoothly.
- There is a natural tension between maintaining the autonomy of individual museums and cohesion of the group; evaluation by a third party and the associated deadlines help maintain this balance. The structure for this process needs to be defined early.
- Collaboratives need public, transparent communication systems. Simple systems, such as email listservs, work well for much of the communication in TEAMS.

Using sub-groups within the collaborative

- Three sub-groups of two museums were set up to create the exhibitions and build institutional capacity of new partners more quickly in TEAMS 2. These sub-groups were ultimately helpful in simplifying the basic unit of communication and work. Higher layers of organization were available when needed or appropriate. For example, if an exhibit developer needed help but could not get an answer from the partner museum, they could easily go out to other exhibit staff members in the collaborative via the exhibits listserv.
- In the paired sub-groups, interactions were at times intense. Because of this, projects took longer than when each museum worked alone, as in TEAMS 1. Better exhibits and increased organizational capacity were the result, however. In addition, close interactions led to much learning about exhibit design and

community relations, as well as long-term relationships with colleagues that strengthened all partners.

- Selecting a sub-group partner closer than two hours drive time away was important for designing and reviewing prototypes, as well as building trust through face-to-face communication.
- In some cases, sub-groups added resiliency and kept the work going in the face of staff turnover by providing backup assistance from staff at the partner museum.

Using overarching themes for the collaborative

- The overarching themes of family learning (TEAMS 1), universal design (TEAMS 2), and fostering child-adult conversations about science (TEAMS 3) helped the institutions deal effectively with areas they wanted to address but could not on their own due to insufficient resources. The themes also helped maintain connection with the Collaborative's advisors and consultants, and formed strong and useful points of contact and legitimacy in the larger museum field.
- The theme became the shared work of the Collaborative in the same way that the exhibitions were the shared work of the sub-groups.

Role of evaluation and evaluators

- Formative evaluation deadlines were a critical part of maintaining discipline within the Collaborative.
- The evaluators changed the culture of the institutions by developing a process for ongoing formative evaluation and an attitude of listening to visitors that hadn't existed before. This attitude now permeates all of the exhibit and educational program development in the museums of the Collaborative, even in projects not connected to the TEAMS Collaborative.
- Collaboratives are in some ways like a writer's group, where it is important for participants to be able to hear—and welcome—critiques from people who can offer sometimes differing perspectives on the products and services produced.

THE OUTSIDE PERSPECTIVE: A ROUNDTABLE OF LEADERS OF OTHER COLLABORATIVES

In 2005, Inverness Research Associates and TEAMS Collaborative leaders Charlie Trautmann and David Goudy convened a roundtable discussion of leaders of other collaboratives to gain their insights

on forming and managing museum exhibition collaboratives. Several key themes and observations that emerged from this discussion are summarized below.

Selecting partners and setting up a collaborative

- Collaboratives should be viewed as neither good nor bad, but rather as high-risk, high pay-off strategies for getting something accomplished.
- When entering into a collaborative venture, it is helpful to recognize differences in institutional culture, language, and decision-making procedures among the institutions.
- Partners should know each other before they start a collaborative relationship; they should look to see that they share common goals and a common mission. Everyone should be able to articulate their self-interest by answering the questions: "What's in it for me?" and "Why are we doing this?"
- Organizations must be willing to change. The priorities of the institution may need to be re-aligned to make a collaborative relationship work. The greater the difference between types of institutions, the more difficult is the job of evaluating how well one organization will fit in with others.
- It may be less risky for small partners if they collaborate with larger institutions, because they can fall back on the resources of the larger institutions if the need arises.

Dynamics and communication within a collaborative

- Early sharing of expectations is critical to success; everything should be written down, early in the process.
- Collaboratives often cause tension in organizations, but creative leaders can in some cases use this tension to make needed internal institutional changes.
- A schedule of regular communication is often more important than the mode of communication.
- Listservs are useful, but it is important to recognize that they have limitations as a method of making sure all partners are in communication.
- Middle managers need to communicate up to their directors, and directors need to communicate down, from what they hear externally to their own group internally.
- Scheduled professional development activities can form a good basis for improving communication within a collaborative.
- It is important to get all issues communicated in writing at the beginning and get leaders to

agree on the basic goals, vision, timelines, problem-solving strategies, etc.

Leadership

- Partnerships based on total equality rarely work; someone has to be in charge, and someone needs to be willing to pitch in and fill any gaps left by a partner who can't or won't live up to expectations.
- Separating the intellectual and administrative leadership creates a useful set of checks and balances on leadership within a collaborative.

Role of evaluation and evaluators

- In addition to working as a common way of assessing what everyone is doing and communicate it to the group, evaluation can provide useful deadlines to help maintain progress.
- Evaluators play a varied role that includes assessment, coaching, and even cheerleading at times. It is important, however, that evaluators do not get so close to the project that they lose objectivity.

STAFF PERSPECTIVE: ESSAYS FROM TEAMS STAFF

The National Science Foundation was interested in having the TEAMS Collaborative reflect on its work and management. As part of a supplemental grant, NSF provided funds to allow staff members to write short reflective essays on their experiences in the Collaborative. Ten essays were written on six general topics. A summary of key points is included below.

Leadership

- The two leaders of TEAMS saw themselves primarily as facilitators, ensuring that all interested members of the Collaborative had a voice in discussions.
- While communicating with each other constantly, the two leaders separated the intellectual and administrative functions, with one serving as chair of the Collaborative and the other as PI on the NSF grant.
- They recognized the built-in tension between leading their individual institutions and the Collaborative as a whole; these potential conflicts of interest were handled by acknowledging the conflict and being clear about positions and interests.
- Early on, the group established a set of working principles that were discussed at the start of all meetings of the Collaborative. The principles included:

- Clear communication
- Clear & shared expectations and vision
- Constant sharing of ideas
- High standards of quality / durability for exhibits
- Mutual trust, respect, and equality among all museums

- To help foster engagement, each director took on a task within the Collaborative, such as coordinating shipping or overseeing the development of marketing materials.
- Because they create the exhibits and programs that form the output of the Collaborative, the leaders tried to create opportunities for professional development and networking and sought to have decisions made by those doing the actual work wherever possible.
- Whenever conflicts arise, it was helpful to frame the resolution process by returning to the goals and vision of the Collaborative.
- Evaluation served the Collaborative in various ways, such as improving discipline, schedule, and exhibit quality; helping the transition to an audience-centered approach to exhibit development; and maintaining a reflective attitude toward the work of the Collaborative.
- The charrette, a process for presentation and group review of exhibit designs, became a highly valued tool among members of the Collaborative to obtain helpful feedback before investing in the building of exhibit prototypes.
- Much of the evaluation emphasis went into formative evaluation at the early stages of the project; the evaluators saw themselves as "critical friends" whose real clients were the museum visitors who would ultimately use the exhibits.

Exhibition Development

- One museum sub-group developed an audio tour for their exhibition and found that science exhibits present special challenges, especially when a hands-on experience requires seeing. A relatively small number of visitors requested the free audio tour units. Ultimately, the museum felt that the results were worth the effort and expense and that usage would grow as public awareness of the availability of the audio tour increased.
- Another museum used their TEAMS project as an opportunity to make the transition from renting interactive exhibits to designing and building them in-house. The results of this experience

have permeated the entire museum and helped create a commitment to improved interactive exhibits museum-wide.

Program Development

- The concept of the design charrette was expanded in TEAMS 2 to the area of educational program development. A charrette of all educational program developers led to a shared understanding of goals, program elements to be created, and design/format features. This shared understanding resulted in consistent, high-quality educational materials to accompany the exhibitions themselves.

Exhibit and Education Staff Collaboration

- The need to create educational programs linked with the exhibits led to increased dialogue and mutual understanding between exhibit and education staff within several museums. Staff from the two areas gained a better understanding of one another's goals and constraints, and the experience helped both to re-focus their efforts on what would ultimately lead to the fullest engagement and learning experience on the part of visitors.
- Using a simple jointly-developed one-page form, exhibits and education staff at one museum were able to follow the progress of an exhibit and provide for structured input at various points of the development process.

Collaborating Across Museums

- For small museums, opportunities for marketing professionals to exchange ideas with colleagues are few and far between. TEAMS provided a forum for this dialogue to take place, with the result that marketing personnel learned new skills and marketing ideas that are transferable to other areas of museum promotion.
- When two museums are involved in creating a joint exhibition, communication is critical at all levels, from the initial broad concept to the smallest of details. Maintaining constant communication and an attitude of "who might need to know about this" among participants goes a long way toward shortening the design cycle and preventing misunderstandings.

Nuts and Bolts

- Keeping excellent records of exhibit components takes time up front but greatly reduces the time for later maintenance and increases professionalism of customer service to other museums

when problems arise. The essay on this topic in Section 5 contains a comprehensive list of what to document and how to do it.

- Technology can greatly facilitate the work of a collaborative, ranging from simple listserv management to the creation of websites and software tools to help with the design and group review of exhibits and program elements. These technologies can be simple and yet effective at low cost and without requiring a long learning curve for collaborative members.

EVALUATOR'S PERSPECTIVE: A POLICY BRIEF FOR FUNDERS OF SCIENCE MUSEUM COLLABORATIVES

Based on evaluation work with the TEAMS Collaborative over the past decade, this policy briefing by Inverness Research Associates presents a summary of both the accomplishments of the Collaborative and the benefits to the nation of NSF investment in collaboratives involving small science museums. Specific conclusions are presented below:

- The TEAMS project represented a major grant for each of these small institutions, and thus it received a significant amount of attention from the museum directors as well as exhibit, education, and marketing staff. The imprimatur of NSF funding allowed museums to leverage those dollars productively, raising local funds and gaining local support for their institutions because of their participation in this national-level project.
- The fact that the NSF invested in TEAMS for three funding cycles allowed for a rare, longitudinal developmental of the Collaborative. Re-investment in the museums supported a cumulative building of capacity over more than a decade and across a range of domains. Both as individual institutions and as a group, they demonstrated increased capacity with the second and third grants.
- This collaborative is a good example of measured and thoughtful investment by the NSF—a longitudinal approach that builds upon and puts to work the return of its previous investment. It suggests that the NSF may want to examine ways to foster other such collaboratives involving small institutions.
- The NSF's investment ultimately was not just about strengthening a group of institutions. It also led to significant development of the individual practitioners, who now are in a stronger position to contribute to the field. Regardless of where the careers of TEAMS participants take them in the future, they will serve the science

museum field with an enhanced ability to create rich interactive exhibit and program experiences.

- TEAMS continues to build on its prior accomplishments. The group is finding new ways to contribute to the small museum community as well as to the broader field of exhibit developers and informal science education researchers.

APPENDIX: DOCUMENTS OF THE TEAMS COLLABORATIVE

The Appendix in Section 8 contains the following documents developed by the TEAMS Collaborative.

- A. Guidelines for Successful Collaboration
- B. Bylaws of the Collaborative
- C. Tour Contract and Schedule
- D. Sample Front-End Survey Form
- E. Characteristics of a Rich Exhibit
- F. Exhibit Design Guidelines
- G. Exhibit Design & Safety Checklist
- H. Elements of Educational Program Materials
- I. Marketing Materials
- J. Facilities Summary for TEAMS Museums
- K. Members of the TEAMS Collaborative

SECTION 3

A Roundtable Discussion with TEAMS Directors

INTRODUCTION

In June 2003 Mark St. John and Dawn Huntwork from Inverness Research Associates talked with the seven Directors² of the TEAMS Collaborative museums about the lessons to be learned from their efforts over the years. In particular, Inverness focused on the knowledge the directors had gained in creating a collaboration involving small museums of science. The discussion included broad themes that emerged around the features and structures of the Collaborative, and the costs and benefits to participating museums. The goal was to better understand the TEAMS Collaborative and to document it to inform other museums interested in designing a similar collaborative. Below is an edited transcript of this discussion.³

* * * * *

MARK ST. JOHN: Let me start our conversation with this idea: since this is an exhibit collaboration of small museums, I guess I need to understand what is special about small museums. What makes a small museum what it is?

SARAH WOLF: I think the number of full time staff is something we pay close attention to—for example, we don't have public relations departments; rather we have one PR person. We don't have education departments with layers of educators; we have one educator. We don't have big exhibit departments; we have, in many cases, one exhibit staff person and then many part-time exhibit maintenance persons.

KATE BENNETT: I think it is important to note that having so few people means the director pays close attention to the exhibit development process.

MARK ST. JOHN: So in a small museum, there is often one director and one education person and

maybe one-and-a-half exhibit people. Does this mean that these people, who are acting solo in their roles, are isolated in a sense?

SARAH WOLF: Because you are small, and because your museum may be geographically isolated, you don't have avenues of getting to know other exhibit builders in other places.

MARK SINCLAIR: I think there are also some other special issues for small museums. For example, there is an issue with how much traveling exhibits cost to rent, and how big they are. In the beginning, most of the traveling exhibits were really big and expensive. We couldn't afford that and we needed to come up with a way to create a pipeline with some exhibits that were high quality, with a rental fee that we could afford and that could fit in our museum.

TRACEY KEUHL: Maybe the assumption out there is that the only good traveling exhibits come from the big museums. I think we proved them wrong. I think the TEAMS collaborative showcases the talent in small museums. And maybe that is encouraging, then, to other small museums to engage in exhibit development. This is important because small museums are more numerous than large museums.

DAVID GOUDY: I think we are beginning to see that, in fact, there are a lot of advantages that small museums have. If you understand the nature of small museums and are smart about designing for them, then you can do well. And I think the learning goes the other way as well; from my own experience I would say that we small museums have a lot to contribute to the larger conversation about museums and their roles in the community. We are much closer to our communities because we are small organizations. We are much lighter on our feet in terms of responding to changes in the community. Also, we are not as small as we seem. We have the scale of the whole collaborative and this scale gives us access to some of the tools we need to develop ourselves. From this empowered position, we can begin to look at the special strengths of small museums.

MARK ST. JOHN: The point you made early on about having the director involved seems important. Are you discovering that there is a real kind of personal and institutional benefit that results from this involvement? Are museums learning from each other; is the collaborative a community in which you all learn about a lot of things?

² Participants included Kate Bennett from Rochester Museum and Science Center; Todd Boyette from The Health Adventure; David Goudy from Montshire Museum of Science; Tracey Keuhl from the Family Museum of Arts and Science; Mark Sinclair from Catawba Science Center; Charlie Trautmann from Sciencenter; and Sarah Wolf from Discovery Center Museum.

³ This conversation has been reconstructed and edited based on a focus group with directors in June 2003, and on individual conversations with directors in summer and fall 2003

SARAH WOLF: I think that is true for both directors and the staff. Our staff has become less isolated because they had people they could call upon through the working relationships developed over the life of this collaboration. I think the staff members appreciate the fact that they are doing something bigger than just serving Rockford; they are creating things that others will see, and they are gaining knowledge. We couldn't afford to have that kind of activity happen on our own. So I think there is a lot of growth that has taken place for our staff because of our involvement.

KATE BENNETT: I agree. We develop ourselves and push each other to think more deeply. We are all roughly the same size; we face many of the same challenges; and so there is that shared growth and development. This collaborative has helped our museum get off of a cycle of renting special exhibitions that are intended to add interactive science to our experiences. Through this work, we are raising the level of our own expertise, improving the quality of our own exhibits, and improving the science experiences that visitors have every day when they come to the RMSC. And being able to talk with a group of colleagues and discuss how to stimulate this growth is important for us.

SARAH WOLF: I think some of the side conversations that the directors have been able to have on personnel and other issues have been invaluable. And the fact that there hasn't been turnover at the director level has also been important. I think we have been good sounding boards for each other and I think those same kind of personal relationships have developed between the staff of all of our museums.

TODD BOYETTE: And in this collaborative, the directors live in the same world that I live in. By contrast when I go to the director's luncheons at ASTC, the guy sitting beside me is a director of a \$15 million operation, whose issues are a little different than mine; here, the issues are similar because the scale is similar.

SARAH WOLF: I think it is important also to note that the scale of the grant is significant to our small institutions. We have had some financial stability in the years we have had the NSF grants; the funding helps pay salaries for exhibit and program development and helps us to stretch ourselves. The TEAMS grants have allowed us to take risks that our small institution would not otherwise have taken. I know the Sciencenter, Catawba and Montshire have all expanded. The Health Adventure is looking at a new facility and we are in planning mode to add on to our

facility. We have all grown. The grant did not fund this growth, but I believe that the TEAMS affiliation has contributed to our ability to maximize ourselves as we did grow.

CHARLIE TRAUTMANN: I agree. In terms of other costs and benefits, the collaborative mechanism certainly gives you access to big-time resources like the National Science Foundation.

MARK ST. JOHN: So that means that as a small museum, you would have a hard time writing a major grant for NSF. But if you bring together a group of small museums, do you then have an advantage? Can you compete on a national basis?

CHARLIE TRAUTMANN: The first TEAMS grant was our first NSF experience. If you're looking at the whole last eight years, without it we may have done some other grant projects, but the Collaborative was the entry point to getting into NSF-size and NSF-quality projects. And it clearly raised our capability for doing the exhibits as well as for raising funds.

MARK ST. JOHN: My sense in listening to all of you is that the collaborative creates shared work—and it is that sharing of the work that is important in bringing you together and focusing your conversations.

SARAH WOLF: Yes, we come to depend on each other. We say to each other, "We are getting an exhibit that you are producing and, therefore, we want you to do really good quality work, because it is going to affect our museum success and audience."

MARK ST. JOHN: So the design of this collaborative—the way you all share the exhibits you build—has a kind of mutual accountability built in. Is it because you share your exhibits with each other that you depend on each other's exhibits to be of high quality? Is that what you are saying?

KATE BENNETT: We all want to contribute to each other's success, so the level of mutual involvement is really intense. I thought that was a wonderful aspect of our collaborative work.

DAVID GOUDY: The exhibits we produce together create our collective reputation. They determine our future abilities to get funding. The exhibits we build now shape how future exhibitions that we produce will be perceived in the marketplace. I would like to see museums out there saying, "It came from a

TEAMS collaborative member, so I know it is going to be a great exhibit.”

MARK ST. JOHN: It seems to me that there is a tension or a balance where, on the one hand, you want to allow museums to have autonomy because you all have different strengths and passions. On the other hand, you want to have a collective review process and you may want some shared characteristics to be present in all the TEAMS exhibits. Do your museums have enough autonomy to do what each of you is good at? And do you have enough joint review and decision making that the TEAMS collection of exhibitions has a shared identity and the quality is ensured?

DAVID GOUDY: This balance is not easy to achieve. I think it is achieved over time. This much I know: the quality of the conversation has been much better this round of TEAMS; we have dealt more with the real issues of museums, exhibits and quality.

KATE BENNETT: It may be possible that you have to get that first cycle done (TEAMS 1) before you can do a second cycle as we have done in TEAMS 2. You need a framework for communication, working things out, and entrusting that you will be able to work together—and all of that was developed in TEAMS 1 and then built upon in TEAMS 2.

MARK ST. JOHN: So there may be an argument here not only for funding collaboratives, but funding long-term collaborative efforts?

CHARLIE TRAUTMANN: I know that over the long term, the personal dynamics are truly important. The dynamics of the collaborative are very intimately connected with the dynamics of the people that are in it. That was one thing that we learned from TEAMS 1. The characteristics of the individual museums and their lead players have a big effect on the whole group.

MARK ST. JOHN: I want to go back to my question, because I want to hear about this balance between the autonomy of the individual institutions and the cohesion of the whole. I don't hear anybody saying that clearly we needed on the one hand much more cohesion and uniformity amongst ourselves, or on the other hand, that we clearly needed much more autonomy.

KATE BENNETT: One thing that was uniform was our agreed-upon timelines. What was really good was the collaborative-imposed discipline of what we were going to get done and when we were going to get it done by. The evaluation visits helped us keep going, and that was crucial to our success. I think the more we create that structure ahead of time, the better.

TODD BOYETTE: I thought the level of autonomy was fine. For us, it was far more difficult to work out the relationship with our partner museum. We eventually did work this out, but that is where the energy was being put. The level of autonomy versus control from the collaborative at large was a secondary issue for us. I do think it would have been nice to have a few more meetings of the entire collaborative, especially in the beginning. Meeting only once a year was difficult. I think having another time to get together between those two meetings would have helped, because we had a lot of questions in between.

MARK ST. JOHN: So maybe there is a principle here: if you are going to bring new partners into an existing collaborative, you had better bring them into the whole group and not count on just the mentor institution to be the sole source of induction?

CHARLIE TRAUTMANN: I want to make one more observation on this issue of autonomy. One of the fundamental differences between TEAMS 1 and TEAMS 2 was the smallest unit of interaction between museums. In TEAMS 2, the smallest unit of interaction was really two museums working together in partnership, the Sciencenter and Rochester for example, and so most of the communication was at that level. In TEAMS 1, the unit of interaction was four other museums instead of one other museum—that is a very different and perhaps more complicated dynamic.

MARK ST. JOHN: So the partner relationship made the communication simpler—it is easier than trying to have all museums trying to keep up with one another?

SARAH WOLF: Yes, that may be true. But it also narrows the opportunity for objectivity and it makes things more personal in many cases.

CHARLIE TRAUTMANN: I don't think we precluded the opportunity for all of us to interact as a group; we had the listserv that allowed each of us to interact with everybody. I thought adding the partner museums was like putting an additional layer on the onion. For the first layer, you had your partner museum. The

next layer was the other exhibit designers, and then there was a third layer beyond that, which was the whole group of museums. So if you weren't getting enough feedback from one layer, there were opportunities within the collaborative structure to find help at these other levels.

MARK ST. JOHN: Since we have started talking about the partnership museums, let's keep going on that. Tell me more about the theory of how partners are supposed to work....

MARK SINCLAIR: In our case, we very quickly realized that it was not a mentor/mentee relationship. Our partner, The Health Adventure, might not know about prototyping in terms of the way you did it in a science and technology exhibit, but they had a very strong culture and they were not just going to say, "You take the lead; teach us what you know." They said, "Wait a minute. We don't even like this idea that you have foisted off on us." So it was a real clash at first.

MARK ST. JOHN: So what were the costs and what were the benefits of having partner museums?

MARK SINCLAIR: For us, the cost was it took a lot longer to build our exhibit than it would have if we had just done it on our own. There were also some hurt feelings in some relationships and staff members even lost their jobs as a result of some of this conflict. But the benefit was a better exhibition in the long run. If we had done the exhibit by ourselves, it would have been much more academic—demagogic science 101. Our partners made us, kicking and screaming I might add, make the exhibit more fun. I think the exhibit was a lot better, but it took a lot to get there.

TODD BOYETTE: I would agree that it certainly took a whole lot longer. I also don't think you have to have complete agreement and shared passion for the end result. That is certainly not the case for us. We gave that ideal up, because many times we were on opposite ends of the spectrum. We got something that we all could live with and moved on—and I think that was the key to our success. Once we got into it, we realized there were large philosophical differences but our partner was stuck with us. We were more flexible than each of us thought the other would be. And it turned out to be fine.

TRACEY KEUHL: Speaking as a "new" member of the Collaborative, the costs for us were the time spent just getting to know our partner and understanding the differences in operational structures. There seemed to be a lot of wasted energy in the form of frustration because working collaboratively wasn't how we were used to developing exhibits, and we had to adjust a little bit to make the thing work. The benefit is that now we have another friend and advisor. Even if we are not in a TEAMS project together, in the future we can use the relationship we have developed and be good peer reviewers for each other.

KATE BENNETT: For me, there were no costs that I didn't expect going into this work. I expected the cost of time; I expected the cost of trouble. I knew I wouldn't let it be the end of Ithaca's and Rochester's relationship no matter what happened. The benefit was that I got some wake-up calls about some of our ways of doing things, about our abilities. The Collaborative helped me see the RMSC better. Charlie was a harder critic than I had been on some of our work and that criticism turned out to be very helpful. The benefits have been tremendous because we have learned so much about the culture of a science center and what it takes to be successful within a community. We hadn't learned how to do that as an institution. We had a partner that was an already established and successful community science center. As a result, we had an opportunity to learn standards and different ways of thinking and doing things. The partner construct was really helpful—we wouldn't have been able to be at the table in the first round (TEAMS 1). At that time, we simply didn't have enough experience in interactivity and thinking through science concepts.

SARAH WOLF: And the partnerships ultimately worked. Viewing all three partnerships, the end product as far as the quality of the exhibits was much improved over TEAMS 1.

DAVID GOUDY: In some ways, these new partners coming in brought some of the greatest strengths to this round of the Collaborative. The exhibits are more consistent and good this round. As a collaborative we have made real progress.

CHARLIE TRAUTMANN: We have made a lot of progress and have a lot of good, fun exhibits. I think overall this was a very good investment for the NSF, for staffs of museums, and for visitors. If you look at where we are three years later, there has been a huge amount of individual and collective growth.

MARK SINCLAIR: One other important benefit of our partners and our collaborative has to do with stability. Small museums have turnover; this has been an issue in both collaboratives. One time our exhibits guy left and another time we lost our education person, and when you are in a small museum, that kind of loss can be significant.

MARK ST. JOHN: So you are saying the collaborative helped with turnover? Even when staff turnover happened, it didn't affect the exhibit development process as much? You could pool your resources around the exhibit?

TODD BOYETTE: And that mutual support is the key to the partnership. At one point, our director of exhibits took another position; without the partnership that would have been devastating because it was right before Inverness researchers came to visit us and do the evaluation of first-level prototyping. There is no way we could have pulled it off and gotten ready, but our partners came in to help, and it worked.

MARK ST. JOHN: So that is a good advantage of the partnership; it adds a redundancy, if you will?

MARK SINCLAIR: We are supplementing each other, and when there is a weakness somewhere, the partner is able to come through.

MARK ST. JOHN: When you develop an exhibit, what is the strategy for dividing up the work between two partners? Does one group do half of the exhibit, or someone builds a first draft, the next one fixes it? How do you divvy up the work of building an exhibition?

MARK SINCLAIR: Once we thrashed through what the topic was going to be and the tone of the topic—how playful to make it versus how academic—then it was easier to divvy up. We said, "You take responsibility for these exhibits and we will take responsibility for these exhibits and you can do the PR and we will do the education." And we actually ended up switching the PR and education responsibilities because we lost staff.

KATE BENNETT: We had a similar situation where our partner's PR person left and then the PR position shifted mostly over to our PR person—then she took some time off so it went back to their PR person, so it was seamless on the PR end.

SARAH WOLF: For the exhibits, once we identified what we thought would be good exhibits, we split it down the middle and prototyped it both places and kept developing the educational programs as well. Tracey's education person was new to museums, while ours had worked in museums for 15 years. So our educator really was the mentor and helped familiarize their educator with how to work within a museum setting.

CHARLIE TRAUTMANN: Initially we made an agreement that we were going to divide the work according to a percentage. They were going to prototype a quarter of them and we were going to do three-quarters of them because that is the way the money was broken out. Then as the process got going, everybody ended up working on everything. In fact, we ended up subcontracting all of the fabrication to Rochester. They built all of the exhibits because they had spare capacity and good cabinet makers there.

KATE BENNETT: But we also had a lot of time where our staff was in Ithaca working in their shop side-by-side, and there was time when their staff was with us.

MARK ST. JOHN: So by necessity with small museums, it seems there was a lot of flow back and forth as the work got done.

DAWN HUNTWORK: It sounds like this "mentor and mentee" vision that was part of the original grant in this case didn't really happen. It seems like there were strengths on both sides and both sides contributed to each other. Going back and thinking about your original idea about bringing in less-experienced museums, is this approach worth pursuing?

CHARLIE TRAUTMANN: I think there were definitely things that were learned on both sides, and they range from the sublime to the ridiculous: from exhibit design and development and prototyping to how to do timesheets that meet NSF standards.

KATE BENNETT: There were many things where I intuitively trusted Charlie's knowledge about science centers because of his experience. That saved us time.

TODD BOYETTE: For us, the mentee/mentor relationship applied a lot more with the logistics of the collaborative—what the expectations were of the folks that we did not know as well.

MARK ST. JOHN: So maybe you all gained a kind of “collaborative capacity”—an ability to be smarter and better at doing future collaboratives?

TODD BOYETTE: I think that is right. I didn’t know how it was going to be. It was much different than I thought it was going to be, but we are better for it, and I think we would do a better job next round.

SARAH WOLF: I think there is a kind of ability to work collaboratively, and we needed to develop that ability. In the beginning we needed an understanding of how each partnership is working things out. And as our partnership went along, there was this period of time when there weren’t any deadlines and we were unclear what was next. As a result we wasted some time.

TRACEY KEUHL: We would do this collaboration again, although I think I would do it with a little more structure up front. I didn’t ask the right questions perhaps of Sarah about what it involved. We anticipated a little more structure from our mentor. They were the experts, and that expectation may or may not have been correct, but that is what we thought was going to happen. I would agree with Sarah: I think a lot of time was wasted. In our situation, we kept wondering, “Should we be doing something? We haven’t gotten word to do anything so I guess we are okay.” When in reality, if we had asked more questions that we didn’t know we should have been asking, we would have been a little more productive.

MARK ST JOHN: So it sounds like collaboratives have to be engineered or grown in a deliberate and thoughtful way....

MARK SINCLAIR: I think I should have gotten our partner museum on board earlier. We were the senior partner so I wrote the exhibit description, and only touched base with them before I sent it to the NSF. I should have gotten more input from them before then. At the first meeting, The Health Adventure staff did not really know what had been put in on their behalf. So this was all new at the first meeting and they were not thrilled, but Todd said, “We are doing it.”

DAVID GOUDY: One of the biggest lessons for collaboratives has to do with choosing partners at the very beginning. Somehow you have to find a mechanism to really study and understand the operating culture of your potential partner in more depth than meeting at ASTC and exchanging e-mail. You have to look at other dimensions of how a place works, relationships between staff and director, operations, etc. Those are things we didn’t do at all. All of the museums were

kind of the same size and known as good museums and beyond that, we had no sense that we had to look any deeper.

KATE BENNETT: The willingness and intention of potential museum partners are hugely important. You shouldn’t have to talk someone into a partnership. They have to be eager. And we were.

CHARLIE TRAUTMANN: So much of this revolves around specific people that it is hard to generalize. If you have good people, things work. We had some of the right people and some not. We needed to do more management when the people were not quite right. What happened is things were dragging on; agreements weren’t acted on, and that was wearing people down. So in response we agreed to set up management milestones—we asked for simple progress reports rather than relying on only the two Inverness evaluation visits. We wanted to have a monthly structure that would help us understand our progress in more fine-grained detail. And those reports didn’t necessarily get into all the difficult quality and personnel issues, but they served as a flag when there were potential problems.

KATE BENNETT: Here is another lesson: Proximity is really important. Even though a lot of work can get done on the phone, face-to-face time is crucial. Ithaca wouldn’t have chosen us if they had had an appropriate closer organization.

DAWN HUNTWORK: It sounds like two hours is kind of a maximum distance in terms of building an exhibit, because you didn’t get together as much as you wanted—is that right?

SARAH WOLF: We probably could have done a better job if we had met at the museums instead of at these halfway places, because it was pretty hard to sit there and talk about something that was sitting up in Rockford or in Bettendorf, and we were halfway in-between in Dixon, Illinois. Everybody had a different vision of what was going on.

TODD BOYETTE: We are about 80 miles apart so we could meet monthly and that helped. I think it would be hard to collaborate as closely as we have if you were 300 miles away.

DAWN HUNTWORK: I want to ask about the theme idea. Is having a theme, like family learning and accessibility, helpful as a collaborative as far as developing exhibits? How does that contribute to the collaborative?

SARAH WOLF: Having the theme was really important for our museum. Again it gave our museum staff more to think about than building an exhibit.

TRACEY KEUHL: The theme also helped us on a more local level. Having that theme and working with a group of other museums from around the country on the accessibility issue lends a little more credibility to what we were doing. I think for our small museum it was important to be part of the collaboration because of the connection with the NSF, but I don't think you can forget the local impact that it has on the next project in your own town.

KATE BENNETT: And the theme helped us all learn more. The number one piece for me was the accessibility day. It changed my whole outlook on accessibility.

TODD BOYETTE: I agree with Kate. And it affected our institution. In this project we struggled to find ways to make our institution more accessible; this collaborative has transformed how we are trying to deal with that issue. We have set some pretty ambitious goals about the kinds of exhibits that we are now going to try to develop. The transformation for this institution is solid.

DAVID GOUDY: I think the theme was a positive aspect of the collaboration. Going through a shared learning process related to the theme in a workshop really changed the way we worked on TEAMS exhibits. But it went beyond that; you hear it coming up all the time in conversations about exhibits. Learning about the theme had a big impact on our day-to-day business. We have maintained a connection with our consultants and all of this has improved the museum, the TEAMS exhibit and our other exhibits as well. We are trying to go back now and re-build existing exhibits that are too far off in terms of accessibility.

MARK SINCLAIR: Accessibility was new to us. We had to do research for a grant and realized how much there was to learn. Now our exhibit developer has an accessibility handbook next to his design area; it's not just lip service at Catawba now.

CHARLIE TRAUTMANN: It's almost daunting—to make something "universally accessible." But what is really good is people tried a lot of different things. It raised a lot of awareness—and as a result we're at a different point in our awareness of the issue. And this spills over into everything we do. My sense is that having a theme is good from many different vantage

points. It's the tie that binds the whole collaborative together.

SARAH WOLF: We are learning a lot about creating exhibits that work well with people with different disabilities; we are stretching our focus. Independently we wouldn't have the ability to do that. It is too expensive for us all to go out to four-day accessibility training workshops. And seeing how we all did or didn't meet expectations in the exhibitions we created has been really valuable. Over all we have internalized the broad themes of each of the TEAMS grants, such as family learning in museums.

MARK ST. JOHN: It sounds like there is an economy of scale that is happening here and that the theme helps to make the collaborative more of a cohesive whole?

CHARLIE TRAUTMANN: Yes. There is another meta-level to this that I wanted to add and that is that the whole idea of shared work is very operative here. The shared work at the partner level is the exhibit. The shared work at the collaborative level is the theme—whatever it is, whether it is family learning or gender issues or accessibility. Without the shared work of the collaborative, without the theme, the collaborative is just a collection of exhibits.

MARK ST. JOHN: Let me ask you about some other mechanisms of collaboration. For example, you tried some different mechanisms to communicate with one another. There were meetings, conference calls, the website, and the listserv. Can you talk about whether or not those mechanisms were helpful?

CHARLIE TRAUTMANN: I would say the listserv was the primary means of communication.

SARAH WOLF: And we did some instant messaging meetings online—which is inexpensive compared to conference calls. But for me they were horrendous; an hour and 45 minutes went by and we had nothing going on.

KATE BENNETT: But you can celebrate that experiment as a piece of the collaborative learning process. I also learned instant-messaging at that time. I think that you have to try things and see what works. Communication is key in collaborations, and you have to find out how to do it. We had a collaborative website that we were initially using well, but then we didn't make as many postings to it as we wished we had during the whole process.

CHARLIE TRAUTMANN: I am not sure the website worked as well as we had hoped it would. For TEAMS 3 I would like to rethink this. But it got people thinking about how to do it. Now we can do cheaper, no-host conference calls. The technology changes and, therefore, we do too. The collaborative has helped people to come along technically. For some of us it is second nature, but for others it has raised and honed their technical skills. Everyone is trying different things and hopefully sharing them.

SARAH WOLF: I think that one nice thing about this e-mailing and putting everybody on the listserv is that communication is visible and available to all. At least I know about the conversations that other people are having so there aren't a lot of surprises.

MARK ST. JOHN: So there is a principle here. Collaborations need public, transparent communication systems?

DAVID GOUDY: I am just thinking that essentially we didn't have any very sophisticated systems for communication and that somehow there was enough trust and continuity of thinking that the collaboration worked. There weren't big issues that polarized people. Our low-level system of communication was adequate. If we were dealing with bigger issues, it might have fallen apart. We didn't get together a whole lot, and people trusted one another and had a common enough vision—so there was something there that was really working, an indicator of something positive.

MARK ST. JOHN: You also had the formative evaluation as a shared piece of work.

CHARLIE TRAUTMANN: I think without the evaluation piece, at both the exhibit level and at the collaborative level, something like this probably wouldn't work very well. I think the evaluation process helped us have discipline in terms of a timeline, of goals in terms of having a certain number of exhibits ready to look at, and those kinds of deadlines.

DAVID GOUDY: I think it goes beyond the discipline though, because evaluation has been part of our learning. For us, Inverness has been a learning resource; we learned that we could bring your researchers here to help us understand how we can ask questions of what we do and how to be disciplined in answering those questions. One measure of the value is that after TEAMS 1 the Montshire staff had a conversation about whether we should

do TEAMS 2 and one of their responses was, yes, we would be interested in being involved in TEAMS 2, if Inverness were to be involved. They saw that as an important resource coming in to help us build capacity and understanding, and that is a key part of the experience. For us, by far the biggest area of growth is being in a situation where imposed upon us was this kind of discipline about prototyping and involving visitors in designing our exhibits. It changed the culture of this institution. The collaborative created the matrix in which this thoughtful development process would happen. We didn't know how to do evaluation like this and couldn't have afforded it ourselves in a way that would have been useful. It now permeates everything we do.

KATE BENNETT: The evaluation process was terrific in terms of staff development. It increased our capacity to listen to our visitors and design interactives.

MARK SINCLAIR: Speaking for our institution, TEAMS 1 was the first time that we really, honestly had ever worked through prototypes.

TRACEY KEUHL: How many times have we put exhibits out on the floor, and we think it is going to work and be wonderful, and the kids take it apart in half an hour? Well, we know how to test exhibits now and without working in a collaborative environment like this, we probably wouldn't have learned, at least not this fast. So that is a big benefit to us. We have learned some things that we can do in or outside of the collaboration that will make us a better museum.

MARK ST. JOHN: It sounds like TEAMS is an important thing within your museums. But really when you think about all of the stuff that is happening around your institution, is TEAMS 1% of the things you worry about—or 5%? or 10%? Where does it fit in terms of scale and importance?

KATE BENNETT: For us, it was one of three big projects we concentrated on because we knew the more we learned from this group of people, the better off our institution was going to be.

CHARLIE TRAUTMANN: For the exhibits staff who were involved in the actual exhibit development work, it was pretty much full time on this project. My own involvement was more in the 10% range and included dealing with grant issues with David plus overall collaborative planning, communication, and administration.

MARK ST. JOHN: So it seems that with small museums you get the significant attention of each institution when the NSF gives a grant through a collaborative; whereas in a large institution, you are not necessarily getting much of their attention?

MARK SINCLAIR: No doubt about it. TEAMS is a big project for us and it is the exhibit priority for that couple of years we are involved.

TRACEY KEUHL: I don't know if I could put a percentage on it, but certainly whether you are actually physically working on it or thinking about it and having it in the back of your mind, it is probably up in the top five things that we did over the last four years.

MARK ST. JOHN: What advice do you have about decision making—about who sits around the table and how do you create a shared vision for the collaborative?

MARK SINCLAIR: The first thing is, you must know and trust the other directors and that is absolutely the most important thing.

SARAH WOLF: I think you must make a list of criteria that will guide your work—and then you sit around and have a discussion about the work, and you listen to how people talk about these criteria.

TODD BOYETTE: You are defining what your goal is: Why are you getting the collaborative together? That would be the very first question you would want to ask and then you try to select the players that help meet that goal—people who have a similar vision.

MARK ST. JOHN: I also have learned from watching you all that there is something about your museums being different from each other but not too different from each other. You want a shared vision in some sense, but enough diversity that you are not the same and you inform each other about your different perspectives.

DAVID GOUDY: Something that struck me both in TEAMS 1 and TEAMS 2 was how easy it was for us to put a list on the board of what we believed in and what our values were. But we all were using a different language, different meanings behind the same words. It seems to me there is a lesson here for collaboratives—they need time and mechanisms to get together to get themselves past that superficial language and really do some talking. There is still some real diversity in what all of us think are good

exhibits. The whole question of how to choose good topics is huge and it is a very difficult concept for us to work on. There is a width of diversity that needs to be defined in terms of what is acceptable and what is not. This is a real issue that needs to be thought and talked about. TEAMS 2 has narrowed the width from TEAMS 1, so that in TEAMS 2 we are still diverse but it starts to feel more like a coherent whole as well.

MARK ST. JOHN: If you think about it, when you build your exhibition you are going to be putting your ideas out and having them scrutinized very carefully and critically by your colleagues. And it is not like they are competitive colleagues. Here you actually want each other to succeed, but there are still different perspectives and everyone is going to speak their mind. So you need a group of people who can do that process of discussion and criticism productively. It is like being members of a writer's group. There is no point in joining a writing group if you don't want your work criticized, or if you are not going to be a fair critic.

TRACEY KEUHL: I think you are better for it, because you have had the trust in the people that you are working with. You trust that they are going to give you some good advice, even though you don't always want to hear it.

MARK ST. JOHN: It appears that the management and governance of this collaborative, the leadership and administration of things, has gone pretty well.

MARK SINCLAIR: David and Charlie have been good leaders. They have gotten us to meet our deadlines but haven't been too dictatorial.

CHARLIE TRAUTMANN: I think maybe the way that we have tried to do this is not so much as leaders, but as facilitators and I don't really call the shots here at all. I don't have any better insights than anybody else at this table in terms of how we ought to do things. I just look at it as trying to make sure that certain things happen.

SECTION 4

A Roundtable Discussion with Representatives of Other Museum Collaboratives

INTRODUCTION

During June and July 2005, Mark St. John from Inverness Research, Charlie Trautmann from the Sciencenter, and David Goudy from Montshire Museum spoke with six experienced museum professionals (who were not involved with the TEAMS collaborative) about their experiences in managing large-scale collaboratives. Each member of the group read an early draft of this monograph, and the discussion focused around how their experiences confirmed or were different from those of TEAMS. Below is an edited transcript of this discussion.⁴

The group also provided specific review comments, which are not reproduced below but have been incorporated in the appropriate sections throughout the monograph.

* * * * *

MARK ST. JOHN: Let me start our discussion by asking this question: based on your experiences and those of TEAMS, what were some of the specific similarities and differences between TEAMS and other collaboratives with which you have been associated?

BEVERLY SANFORD: We were involved with both the Magic School Bus (MSB) and Science Museum Exhibit Collaborative (SMEC). They were different in purpose and scope and partners; *the main challenge for MSB was time*; we had less than a year to pull products together. The collaborative process got better with time, as with TEAMS. Communication was a real issue, but it also got better. I prefer face-to-face communication at least twice a year. Trust was an issue. Meeting deadlines was a source of institutional stress. Institutional culture was an issue as well, including differences in process, language, and decision-making. All of these need taken into account in a collaborative.

PATTY MCNAMARA: I worked with the Exhibit Research Collaborative (ERC) in 1980s and am now part of a Chicago-based collaborative. These collaboratives were different from TEAMS in that they had a range of sizes of institutions from small (Impression

5) to very large (MOS Boston). It's probably less risky for small partners if they are in with larger partners. Also, it gives a real range of viewpoints when different sizes are involved. ERC was spread out across the entire US, so there was little chance to get together except at the national meeting once a year.

DENNIS SCHATZ: We were part of the ERC, with the Oregon Museum of Science and Industry (OMSI) as the leader. Differences in collaboratives, however, are not as great as they seem to be when comparing large and small museums. All the issues of communication, differences in style that TEAMS dealt with were also there for larger museums. The SMEC was the first collaborative, and it had no NSF money. The ERC helped to get evaluation into the mainstream, and Patty McNamara was instrumental in getting this to happen. Professional development and learning together were key elements of getting it all to work. The challenge was to get people on the same page regarding "what's in it for me" and to get everyone involved, not just as a receiver, but as a provider in some substantive way. In our Origins (TV) collaborative project, we are trying hard to have everyone feel that they are a quality partner.

JOE HASTINGS: My experiences have been with the Exnet and TexNet. Both of the collaboratives work on a hub-and-spoke model, which is different from TEAMS, and one of the key challenges is to get participating museums to really engage and to ask for what they need. It's been a challenge at times to get everyone on the same page.

TOM KRAKAUER: I have taken part in various collaboratives over several decades. One of the most recent has been North Carolina's Grassroots Collaborative. This collaborative was more focused on funding than TEAMS, but we also created a series of exhibits through an NSF grant. In contrast with TEAMS, there may be advantages in having institutions of different sizes, because it will be easier for the larger institutions to pick up the dropped balls.

DENNIS BARTELS: In my experience, collaboratives are neither "good" nor "bad" inherently; rather they are high-risk, high-payoff strategies. The chances of succeeding in the collaborative may be lower than going it alone, and the costs are going to be much higher in time, energy, and effort. But the reason you do it is you think there is something you're going to get back that makes it worth it. Larger institutions are inherently more able to take the risk and stress because of having greater resources available to cushion the extra costs. All of this needs to be

⁴ This conversation has been reconstructed and edited based on two conference calls with six museum professionals in June and July 2005.

acknowledged upfront, so that institutions can make wise decisions on whether to take part in a collaborative or not.

MARK ST. JOHN: What would you consider to be some of the most important issues in selecting partners and setting up a collaborative?

TOM KRAKAUER: Collaborative partners should know each other before they get started; they should not simply meet for the first time at an ASTC conference, decide to collaborate, and move forward with a project. Besides this, there always needs to be someone willing to pick up the slack and make things work, because often there is someone in the group who can't or doesn't meet expectations.

DENNIS SCHATZ: It's helpful to recognize from the start that it is often the relationships you build during a collaborative project that will have the most long-lasting impact.

DENNIS BARTELS: Partners should be able to define their self-interest up front and articulate it to the group. If they can't, then the chances for success are limited. It was clear, for example, that in the TEAMS collaborative, the Rochester Museum & Science Center had very clear goals for joining the project and hoped that it would cut the time for them to gain expertise in exhibit development.

BEVERLY SANFORD: This project put a lot of stress on both the people and the organizations. Probably the gains were worth it, but the organizations need to go into it with their eyes wide open, and the priorities of the organization may need to be re-aligned to make the collaborative work.

MARK ST. JOHN: Also, it seems to make sense to continue working with a group that works together well, rather than starting a new group every three to four years. The TEAMS collaborative figured out how to do this, almost as a family.

DENNIS BARTELS: Trust is a central concept to game-theory; the more good experiences you have with a person or an institution, the more you are likely to trust them and stay in the game. Repeated play is an important feature of collaborations and tends to be underemphasized in the spot-market for collaboration. It reinforces longevity.

JOE HASTINGS: It is helpful to be as open and honest as possible. Because of the structure and funding

of ExNet, we don't have the luxury of turning away potential participants. We haven't found a checklist that helps determine if a potential participant will really engage. We make a site visit and talk with board, staff, and then after much communication, we try to gauge the level of interest and excitement.

DENNIS SCHATZ: Knowing people and having a personal connection is key. Look for common goals and a common mission. The further you get from the same type of organization (a science center, in this case), the harder it is to figure out if the match is good. A competition among potential partners can be good to help gauge the level of enthusiasm, the resources a potential partner might bring to the table, and whether they see the collaborative as a valuable resource.

JOE HASTINGS: One of the criteria for taking part in a collaborative might be: "Is the institution willing to change?" Even as the hub of the ExNet collaborative project, the Exploratorium has made some changes that have been good for the institution and have created new opportunities for staff.

DENNIS SCHATZ: Sometimes, the institutions that are biggest get the least out of a partnership; the impact for a small institution is greater if the partnership makes up a significant part of what the institution is doing. We did the Science Carnival collaborative years ago because we thought it was important for the field. Many people at Pacific Science Center, however, felt that there was not much in it for the Science Center itself, and we didn't continue the project after completing the first round.

MARK ST. JOHN: Let's probe more on this issue of getting people on the same page. What are some strategies that work best for communication among collaborative members?

BEVERLY SANFORD: Communication methods have changed dramatically. When the ERC started, we didn't even have fax. But when looking at communication in general, the sharing of expectations early on is critical.

TOM KRAKAUER: Maintaining a schedule of communication and the content are more important than the method. Listservs often don't work very well, and it is better to have a schedule of regular communication set up.

DENNIS BARTELS: It is critical for middle managers to have good communication internally and to tell directors what they need to know. Also, trust is important, and email is not always the best way to develop that trust; face-to-face meetings are generally better for this. Another issue is who to copy in emails on difficult issues. Sometimes people say things on listservs that they shouldn't say publicly, and it can take some work to fix things and take you off-task when people get sloppy on email.

MARK ST. JOHN: TEAMS tried to use a working website for communication on exhibit development, but the approach never quite reached critical mass for usage.

PATTY MCNAMARA: There needs to be a balance between structured communication and more informal communication, where you just pick up the phone and ask about a question you have—the kind of communication that develops when you have gotten to know the other people in the collaborative and what their strengths are. In ERC, I settled into a role where I was the center of a communication network. I had visited all the sites and could help people make connections by knowing whom to contact internally. This ended up being very useful to the collaborative.

DENNIS SCHATZ: It is important to set up a communications strategy early so everyone has a sense of the overall structure. Everything needs to be written down.

JOE HASTINGS: We found that professional development activities work well to increase communication; they form a good opportunity for people to get together and are where the bulk of the business conversation takes place. We therefore push professional development in ExNet not just for capacity building, but for communication. We hold an annual meeting separate from ASTC, and use teleconferences from time to time. We now try for as many meetings as possible, even if only 8–10 participants come to any particular meeting.

DENNIS SCHATZ: We have a teacher education project, with 7 regional alliances around the state, and 4 leadership people from 3 parts of the state. We hold regular meetings of the leadership and regional alliance membership. We have found that sending an agenda out beforehand is important in getting people to think about the issues beforehand and fostering more efficient communication during meetings.

MARK ST. JOHN: Let's now look at the issue of leadership. What do you see as the most important role for the leader of a collaborative to play?

BEVERLY SANFORD: The model of separating the administrative and budgetary leadership and the intellectual leadership of TEAMS worked well.

DENNIS BARTELS: I want to challenge the notion that equal partnerships are best. Partnerships based on equality very often fail. It seems to work better when one partner is "more equal" and when someone is in charge. That seemed to be the case with TEAMS.

MARK ST. JOHN: For TEAMS, it seems the evaluation process was the glue that held the group together. Was this the case elsewhere with other collaboratives?

PATTY MCNAMARA: For ERC, part of the mission of the collaborative was to train everyone in evaluation at the participating museums. Evaluation served as the taskmaster—the common way of assessing what everyone was doing and then communicating it; it became a creative tool for communicating with each other. We didn't emphasize use of evaluation simply to determine if each exhibit met the design criteria; rather, we asked the question: "Can we develop a better exhibition that will work in a wider range of environments by applying formative and front-end evaluation?"

TOM KRAKAUER: In TEAMS, it came through loud and clear that Inverness's role was viewed as a positive and non-threatening way to do things better. It was a roadmap, rather than report card.

BEVERLY SANFORD: It seemed like the participants in TEAMS really wanted to learn about evaluation. In the MSB collaborative, evaluators really kept us focused and moving toward the target.

MARK ST. JOHN: I've often felt that one of the most important roles for an evaluator was just coming to visit and forcing overstressed people to get it together and pay attention to what they needed to get done.

DENNIS BARTELS: Evaluation does help to create artifacts for a focused discussion and a place to develop a common language. It is also an early warning system and provides a type of check and balance on the leader. Often, problems come up first during the evaluation.

DENNIS SCHATZ: Most people think of evaluation as “did it work or not?” But it’s also very helpful as an outside agitator. However, there is a need to be careful that the evaluators don’t get so close to the project that they lose objectivity. The needling is important, but evaluators also serve as cheerleaders and coaches at times.

forward, people know the structure within which they can work. All of this should be a framework and not so structured that it becomes a straitjacket.

JOE HASTINGS: The evaluators for TexNet were helpful in just reading through and restating the proposal, putting it into a bubble diagram, setting a baseline of expectations.

MARK ST. JOHN: Finally, I want to explore the question of how does a collaborative allow maximum flexibility, autonomy, and creativity while at the same time ensuring enough discipline to make sure that the deliverables are completed on-time, on-schedule, and with acceptable quality?

PATTY MCNAMARA: In ERC, the schedule of museums was not the same, so exhibits came out at different times. This allowed for multiple review points because not everyone had to get everything together for a review meeting, as well as more in-depth review of exhibit ideas and designs because the group could focus on only one or two sets of exhibits.

DENNIS BARTELS: For TEAMS, the project seemed to exacerbate tensions existing inside the museums. Sometimes museums seem to use this as an opportunity; RMSC, for example, used TEAMS to make institutional changes they wanted to make. Collaboratives can be used as leverage, but can be disastrous to specific people who may lose their jobs.

BEVERLY SANFORD: The key issue is allowing enough time in pre-planning to get all the issues on the table and get the leaders to buy in; timeframes need to be identified and logical checks and balances established.

JOE HASTINGS: We have contracts with everyone for ExNet, but rarely do we pull them out to resolve an issue. There is little that a partner could do that couldn’t be fixed with a conversation. The flexibility in our collaborative is in the professional development workshops. Follow-on funding proposals have been written using pre-paid partner days, for example.

DENNIS SCHATZ: It’s really just a matter of a code of conduct. You have a written set of agreements on which you build everything else. That becomes the scaffold and should have mechanisms for resolving differences of opinion. With that, you can move

SECTION 5

Staff Essays

OVERVIEW

In 2002, the TEAMS Collaborative received a supplemental grant from the National Science Foundation to refine the Collaborative's staff professional development efforts. Among other activities, the grant provided the opportunity for staff involved with TEAMS to write essays about some aspect of their experience in the project.

We invited staff members to reflect on their experiences and document any ideas that might benefit the larger museum field, while illuminating key aspects of the TEAMS Collaborative. Ten staff essays were received. They have been lightly edited and grouped thematically according to the categories below:

LEADERSHIP

- ◆ "Who's In Charge? Reflections on Leadership and Communication" by Charlie Trautmann, Executive Director, Sciencenter and David Goudy, Director, Montshire Museum of Science

EXHIBITION DEVELOPMENT

- ◆ "Developing the Audio Description for Body Carnival," by Karen Jordan, Exhibits, The Health Adventure
- ◆ "Prototyping Our Future," by Rich Smith, Exhibits, Rochester Museum & Science Center

PROGRAM DEVELOPMENT

- ◆ "Moving Out of the Unknown: The Role of the Charrette in Program Development," by Corinne Sosso, Education, Discovery Center Museum

EXHIBIT AND EDUCATION STAFF COLLABORATION

- ◆ "The Relationship Triangle: Exhibits and Education Staff Working Together in Exhibit Development," by Rich Smith, Exhibits, and Calvin Uzelmeier, Education, Rochester Museum & Science Center
- ◆ "An Educator Learns to Think Like an Exhibit Designer: Or, 'How People People Can Learn to Think Like Stuff People,'" by Jim Taylor, Education, The Health Adventure

COLLABORATING ACROSS MUSEUMS

- ◆ "TEAMS Collaborative Provides Forum for Sharing 'Best Practices,'" by Kevin Coburn, Marketing, Montshire Museum of Science
- ◆ "Communicating Your Way Through Exhibit Development Partnerships," by William Katzman, Exhibits, Catawba Science Center

NUTS AND BOLTS

- ◆ "Record-Keeping and Documentation," by Kathy Krafft, Exhibits, Sciencenter
- ◆ "Internet Technologies for Collaboration," by Bob Raiselis, Exhibits, Montshire Museum of Science

Who's In Charge: Reflections on Leadership and Communication in the TEAMS Collaborative

CHARLIE TRAUTMANN, EXECUTIVE DIRECTOR, SCIENCENTER AND
DAVID GOUDY, DIRECTOR, MONTSHIRE MUSEUM OF SCIENCE

Charlie Trautmann has served as executive director of the Sciencenter since 1990. David Goudy has served as director of the Montshire Museum of Science since 1981. Both helped to organize the TEAMS Collaborative in 1995.

In this essay, we share some philosophy and experiences resulting from a decade-long experiment in leading the TEAMS collaborative. Like most science museum professionals, neither of us has had much formal leadership training, learning mostly through experience. What follows is a summary of what has worked for TEAMS, offered with the recognition that every collaborative is different and that what worked for us may or may not work in other settings.

Our initial decision to collaborate as leaders of TEAMS was preceded by five years of friendship and mutual respect as colleagues. One of us (Goudy) had overseen the transition of Montshire from a small start-up in a former bowling alley to a vibrant museum in an attractive, riverside facility, while the other (Trautmann) had guided a grassroots startup organization in the transition from a series of storefront locations to a permanent facility built by community volunteers.

There wasn't much discussion about leadership initially. After several pre-grant exploratory meetings of the five museums of TEAMS 1, there was a consensus that the two of us were best positioned from an institutional and experience standpoint to serve the Collaborative as leaders. As the second and third NSF grants were conceived and applied for, there was never much discussion about making changes because things seem to be working well and no one else felt a strong urge to take on the responsibilities, and we were willing to continue doing the work of leading the Collaborative.

The NSF's support has been a major factor in the evolution of the TEAMS Collaborative. As a result, leadership of the Collaborative as an independent entity and leadership of the NSF grants are substantially overlapping and mutually reinforcing. Formally, Trautmann has served through the entire history of TEAMS as the Collaborative's chair. Goudy, whose institution is the NSF grant recipient and administrator on behalf of the Collaborative, is the project Principal Investigator. As will be further described however, we quickly developed a more informal, and itself highly collaborative, approach to sharing the leadership with minimal concern for the formal "job descriptions." This structural duality was the initial impetus for our leadership model. Only after several years of operation did we realize the wisdom of the model for broader and more important reasons.

Our leadership philosophy might be summed up by the word "facilitation." We take a behind-the-scenes role that sets up everyone in the collaborative for success and growth whenever possible. This approach is possible largely because all of the museum directors saw the benefits for their institutions of participating in TEAMS and quickly embraced the initial vision and concept.

We spend a fair amount of time framing issues and preparing for useful discussions by other directors and staff. Rather than making decisions for the group, we commonly find ourselves discussing how to present the appropriate information and background so that the directors group or others can reach an informed decision most efficiently. For example, at one point, the Collaborative needed to arrange a unified exhibition tour schedule that addressed various conflicts at multiple institutions. Several rounds of online discussion and phone calls ensued, based upon information related to goals, constraints, and prior history of tour schedules. In this case, we never ended up making a decision as leaders: the Collaborative converged on a solution involving a number of compromises, and all seven museums accepted this schedule as the best solution for the collaborative, even if all of their individual needs were not totally met.

We recognize that commitment comes through genuine engagement and feeling valued as a participant, which in turn come through activity, involvement, and a sense of ownership. This led us to divide up and share the overall administrative responsibilities so that the tasks were fairly distributed. Each museum director in TEAMS takes on a task, whether it be to coordinate insurance and shipping logistics, organize and host collaborative training sessions, oversee the marketing and promotional plan, or research the next proposal. We feel that it is not criti-

cal who actually does the work, as long as the work gets done well and on-time.

Leading a collaborative such as TEAMS requires the wearing of dual hats: one as ship's captain (of one's own museum) and another as fleet commander (of the collaborative). Should exhibits change over in the middle of school field-trip season? How many staff members should attend collaborative meetings? Should all members of the collaborative develop certain educational program elements if only a few museums intend to use them? Because of the range of organizations and their governances, institutional cultures, and individuals represented in the collaborative, there are many opportunities for minor, as well as major, conflicts of interest.

When faced with potential conflicts of interest, we first acknowledge the conflict and then be clear about whether we are representing our own institution or that of the collaborative when we present a particular point of view. Directors from other museums usually understand these conflicts and are willing to work together to find an acceptable solution, as long as positions and interests are explicitly stated upfront.

Many publications on collaboration express the need for a common vision and shared goals among collaborative partners. We have found this to be true as well, and at the beginning of every meeting of the collaborative, we begin with a re-statement of the goals and a vision of the desired results for TEAMS. At one early meeting, we asked staff to write down two things they considered most important about working in a collaborative. We compiled the responses into the list that appears in Appendix A, and at each meeting we present the list as a reminder of how we should interact with each other.

A healthy collaborative requires substantial and timely administrative support to assure that questions are focused, decisions made, schedules met, and information flowing. In hindsight it is obvious that TEAMS benefited from the fact that both of us had similar philosophies and styles of institutional management. As a result, we quickly and informally evolved a working style that allowed for an easy and fluid sharing of the work load. This sharing of work prevented either of us from feeling overwhelmed or that the collaborative is conflicting with management of our own institutions. It creates a back-up system so that when one of us is on a deadline or traveling and cannot respond in a timely manner, the other can pick up the slack. Perhaps most important, we serve as each other's thinking partner when needed. Communication between the two of us averages over three email exchanges per week, as well as frequent phone conversations, and has continued at this pace for the past decade.

We recognize that everyone wants flexibility and the opportunity to experiment with ideas, only some of which will succeed. Our approach is to remain as flexible as possible and to let members of the collaborative try new ideas—ourselves as leaders included—and keep what works while letting go of what doesn't work. Over the years, we have tried various forms of communication, educational programming, exhibit ideation, prototyping, evaluation, etc. Some ideas, like communicating through online director chat sessions, never caught on and were dropped. Others, like investing in joint professional development workshops, have been highly successful and continue as beneficial features of TEAMS.

One advantage of working in groups is the breadth of knowledge and skills available within the group. This breadth serves as a giant tool box that can be leveraged when leaders encourage flexibility, creative thinking, and prototyping of ideas and solutions to problems. In the case of TEAMS, the expertise made available to the group ranges from website management to the design of marketing materials and knowledge about exhibition insurance.

Nearly everyone, especially in a collaborative of small institutions, has times when he/she is unable to respond to collaborative needs because of other deadlines, travel, or other constraints. We accommodate such problems with availability in several ways: 1) by planning deadlines well in advance and making expectations clear and in writing from the beginning; 2) by keeping a big-picture perspective and distinguishing between a critical deadline and a non-critical deadline; and 3) being willing to step in and fill a gap from time to time.

We believe that it is important to model the approaches and attitudes that we want others to express. In the case of leading a collaborative, this means responding quickly to requests, communicating frequently and appropriately, and being willing to compromise when our museum's needs and Collaborative needs conflict.

Building confidence and trust among the participating directors was an important leadership focus during the initial phases of TEAMS. As that was accomplished, the effort subtly shifted to professional staff within the museums—in a direct sense, using the Collaborative as a model to influence and support management systems within the member museums (which in turn strengthened the work of the collaborative in a positive feedback loop). As we directors gained confidence in the TEAMS process for planning, designing, and fabricating exhibits, and for creating a network of close colleagues for our often isolated professional staff, it became easier to trust and empower these staff.

During the early years of TEAMS, many of the participating directors were uncomfortable having the exhibits (or program) staff meet without the director present. And, in turn, staffers were afraid to make even modest decisions without "checking in." While this management style is common in small, understaffed museums, this approach burdened the collaborative effort and unduly restrained creativity in the design process. With time, however, the role of the seven TEAMS directors has shifted to serving as enablers, coaches, and sounding boards. Collaborative meetings of the professional working groups now require little, if any, direct involvement by the directors, and our role is to facilitate sufficient meetings and communications for the interest groups with representatives from the areas of exhibits, education, and marketing and enable them to do what they do best.

While communication within a centralized organization is difficult, maintaining good communication throughout a distributed organization like a collaborative presents special challenges. As leaders of the collaborative, our efforts are guided by the belief that when people know each other on a face-to-face basis, they are well positioned to avoid miscommunication on a remote basis.

Therefore, we provide opportunities, particularly at the start of a grant cycle, for members of the collaborative to meet in person both professionally and socially. Often this takes the form of a meeting, design charrette, or professional development workshop followed by a group dinner or barbeque. It is heartwarming to see how staff colleagues now look forward to meeting each other at these events and sharing project ideas as well as personal news.

Email provides the backbone for most of our communication. However, when judgment indicates that an email contains either sensitive information or refers to a potential conflict, we may call the sender and avoid getting caught up in an email loop, with the associated potential for misunderstanding.

We maintain and use five active listservs for the collaborative: directors, exhibits, education, marketing, and the entire Collaborative. Our external evaluators also receive listserv messages so they can monitor the process of communication. We went for several years without realizing that our listservs were set to "reply to sender only" rather than to the entire group. This glitch caused many missed communications early on and is a potential issue worth being aware of.

Sometimes, it can be helpful for one director to discuss an issue separately with a colleague, and as leaders, we have served as a sounding board or informal counselor on several occasions. When doing so,

we keep confidential matters confidential and resist the temptation to fix the situation with our newly acquired inside information. In any case involving a conflict, we find it helpful to return to the vision and goals for the collaborative as a way to see beyond the immediate issue and help place it into perspective.

One of the greatest sources of satisfaction in leading a collaborative comes from seeing the group accomplish something that its members might not otherwise accomplish alone, through lack of resources, knowledge, skills, or experience. The TEAMS collaborative has met its goals in large part because of the ability of its members to keep the big picture in mind while facing their immediate, day-to-day challenges.

Developing the Audio Description for *Body Carnival*

KAREN JORDAN, THE HEALTH ADVENTURE

Karen Jordan was formerly director of exhibits at The Health Adventure from 2000 to 2004 and worked with the TEAMS Collaborative beginning in 2001. Her essay describes the goals and mechanics of creating an audio tour for their exhibition "Body Carnival."

As part of TEAMS 2, The Health Adventure in Asheville, North Carolina and Catawba Science Center in Hickory, North Carolina developed *Body Carnival: The Science and Fun of Being You*. A complete audio description, especially designed for visitors with sight impairment, accompanies the exhibition. We worked with DASI (Descriptive Audio for the Sight Impaired) to develop the audio description. DASI offers audio description for live theatre in Asheville. This was their first attempt at developing an audio description for an interactive science exhibit, and they were very excited about our project.

We had an extensive prototyping process with *Body Carnival*. Exhibit design and text panel development were constantly revised in response to visitor evaluations. Concurrent with the audio description development, DASI also served as a resource for label copy development for our low-vision community. Prototypes with varying color combinations and font decisions were evaluated. The 1 ½" tall white numbers on black background locator plaques and Arial Black font on text panels were specifically chosen to benefit the low-vision community.

Body Carnival was installed in January 2003. In February, DASI visited the exhibit. To develop the audio description, DASI had four teams explore the exhibit. Each team had a print-out of the completed

text copy for the whole exhibit. The teams consisted of two people, a person with visual impairment and a sighted note taker. The note takers in this case were describers who had previously done audio description for live theatre. Each team visited all fourteen modules of the exhibition.

The exhibits in *Body Carnival* seem to fit within three distinct categories of visual accessibility. The first category of exhibits is accessible with the audio description. The second category is accessible with a sighted companion at the exhibit. (For example, a sighted companion is needed to read the numbers on a height slider or a weight scale.) The statement "a sighted helper is needed" precedes the audio descriptions in this category. The third category is not accessible for people with visual impairment. There are several exhibits where the use of sight is needed to experience the exhibit. For example, a visitor needs to see the rotating star field in one of the exhibits to experience dizziness; seeing is an integral part of the exhibit. Preceding the audio of this exhibit is the statement, "This exhibit is highly visual."

To prototype the audio description we had several people with sight impairments who had never been to *Body Carnival* before evaluate the audio description before it was recorded in its final form. The descriptive location of some interactives and the number plaques were changed to reflect input from our test visitors.

Since, as a traveling exhibition, *Body Carnival* will never be set up twice in the same configuration, there was a need to state in the introduction on the audio description that there are fourteen different exhibits of differing shapes and sizes that the visitor may go to in any order. The audio description included instructional information and science content for each of the fourteen modules. Even if some of the exhibit components were not accessible to our visitors with sight impairments, a sense of the exhibit including visual description, interactive instructions and science content was included for every exhibit component.

The audio description was recorded onto handheld audio units through the use of a software package and MP3 files. These units were then available by request at the museum's front desk. Visitors carried the handheld units throughout the exhibit. The locator plaques were 3" x 3" squares with 1 ½" tall raised white numbers on a black background with Braille under the numbers. When the visitor came to a module with a locator plaque, they accessed the audio description for that module by inputting the number into their handheld unit. These units had external speakers with volume control or jacks for personalized earphones. Shoulder straps were available as

well, so visitors could use the interactives with both hands.

In one of the preliminary meetings with DASI, there was discussion about the “stigma” of having to use the handheld units. Some folks would have preferred to have the audio built in to each individual exhibit module. In this way the hear-phones and audio are always available for use. Another advantage to this system is that the visitor is not inconvenienced by having to check out the units at the front desk.

We are still considering this information for future exhibit development. There are pros and cons to each system. Budget considerations and the ability to add audio description for our existing exhibit components to the handheld units played a major part in the decision to buy the handhelds. For comprehensive use in small science centers like The Health Adventure and Catawba Science Center, we felt that the handheld units would better serve our museum communities. With a one-time investment in the units and charge rack equipment, we have a system that will serve our museum visitors for years to come.

Marketing has played a very important role in getting the word out that the exhibit is accessible. Notifying organizations that assist the sight impaired community in museums’ local area is very helpful in letting folks know that there is audio description available. Even with the marketing and excellent word of mouth advertising that we received, however, I have been somewhat disappointed in the usage of our audio equipment. We have had the audio description on the museum floor for one full year and we have had less than 0.0001% of our visiting population request the audio.

Despite this, we have learned, in discussions with DASI, that folks with disabilities are finding that museums, cultural venues and festivals are becoming more accessible to all users. Attendance will grow with awareness, good public relations and the knowledge that increased accessibility is good practice—for everyone.

Prototyping Our Future

RICH SMITH, ROCHESTER MUSEUM & SCIENCE CENTER

Rich Smith has served at the Rochester Museum & Science Center from 1994 to the present and has been associated with the TEAMS Collaborative since 2000. He is currently manager of interactive development. His essay describes some of the details of the transition that his museum made from renting traveling exhibitions to creating them in-house.

In today’s busy world, our marketplace is full of disposable goods—from silverware to contact lenses; people even feel the need to buy a new car every three years. Even a museum exhibit, designed to last only a few months on the gallery floor, could be considered disposable.

In the past, the Rochester Museum & Science Center (RMSC) rented traveling exhibitions. Oftentimes, we would build family friendly components to complement these exhibits. These traveling exhibitions would stay in our galleries for three- to four-month spans. However, after the exhibits moved on, we were left with empty galleries for all our hard work. In 2000, the RMSC began to strategically focus on redoing all our exhibit halls with interactivity. We were thrilled to join TEAMS 2 as a mentored organization. We had a chance to work on a project that would not only be judged on dwell time and comprehension, but longevity as well. Our TEAMS 2 partner, the Ithaca Sciencenter, has a staff of veterans seasoned in building permanent science-based interactives, an area where we wanted to gain experience. Under their leadership, we were challenged with the task of developing, designing and building interactive exhibits that would stand the proverbial test of time on the ASTC traveling exhibition list. What a great new challenge!

Together, both museums started the exhibit development process: idea conception and prototyping. During this step, we field-tested all of our interactive prototypes with the public. By incorporating as many of the components that were to be used in the final interactives as possible, we were able to foresee some of the issues we might run into when the public creates their own experiences with open-ended interactives. For instance, if we incorporated a large, swinging pendulum into our exhibit, it needed to be engineered to hold the weight of a person.

As we progressed, we worked to create prototypes that looked and worked as close to the final interactives as possible so customer navigation could be studied and label copy could be tested. Additionally, we set up the prototypes in both museums, allowing us to observe how the experiences might differ in different locations. This gave us the opportunity to start designing the final look of the interactives before the prototyping was complete.

Because of our experience in cabinetmaking for exhibitry, the RMSC became the cabinetmaker of the exhibition. We decided to construct the exhibits out of Baltic Birch, a void-free, sanded-surface plywood. The main advantage to using this material is that once it’s laminated, all corners and exposed edges can be rounded over for safety. This also allows the

laminate to be away from the edge, eliminating most situations where it may be chipped off.

The cabinets were constructed to be as robust as possible, while keeping them manageable for two-to-three people to move and set up. Where this was not possible, we built a rolling crate or cradle.

Because low maintenance is always a goal, an accompanying manual of part numbers and how-to descriptions with images was created for each. We also kept a template for each cabinet on file. This enables us to easily recreate a part (e.g., a table leg), if needed in the future.

The exhibition, *Cool Moves: The Artistry of Motion*, is now on tour. The experience of collaborating with the Sciencenter, from concept through a final evaluation process, was successful. The RMSC has taken part in creating an exhibition that is being embraced by the public, and we were exposed to what it takes to develop and construct science interactives. The entire experience has allowed the RMSC to understand what is behind the commitment to create first-rate science interactives.

Moving Out of the Unknown: The Role of the Charrette in Program Development

CORINNE SOSSO, DISCOVERY CENTER MUSEUM

Corinne Sosso has served as a director of education and programs at the Discovery Center Museum from 1999 to the present and has been associated with the TEAMS Collaborative since 2000. Her essay describes the value of an educational program charrette in helping her and other the education staff members throughout the Collaborative to reach consensus on the format and content of programs they were developing to accompany the traveling exhibitions.

I walked into it without knowing what I was in for. My predecessor at my new place of employment had finished the first TEAMS project, including the program materials that corresponded with the exhibits. The TEAMS 2 project theme had already been approved and exhibit ideas sketched out. As an added twist to TEAMS 2, two museums were pairing up to create exhibits and programs. The budget called for less than 40 hours of my time over the next two years—not one-tenth the time actually needed to pull together content and process, to mentor, and to develop programs that would go out on the road.

My cohort at our partner museum had a strong science background and years of teaching experience. But as a newcomer to the museum world, she looked to me for the lead on this project. I had only

a preliminary idea of where we were going and had never had the opportunity of working with another museum to develop programs. We met initially and worked on our first assignment: define the science concepts that served as the basis for our exhibits. I felt like I was on a toboggan going rapidly downhill: I couldn't steer, only throw some weight one way or the other and hope to miss the trees. The exhibit outlines seemed set, education support only offered a concept framework after the fact. It was early autumn, 2000.

Three months later we made a brief presentation at an exhibit charrette, a working meeting where ideas and concepts could be pounded out and refined. As an educator, I thought the priorities were switched: exhibit staff were meeting and planning for several days; education staff, for a few hours. Exhibit departments were driving the TEAMS 2 process, education products were "fillers." That brief gathering with program staff from other museums in the Collaborative helped us set a course, but we weren't sailing together.

I had grandiose ideas of developing new materials devoted to actual exhibits, not just something pulled out of the "science drawer" for whatever topic and loosely tied together. I envisioned activities and explanations that complemented many or all of the exhibit experiences, along with extension activities for teacher packets. At that January meeting, all the educators in the collaboration agreed on what we wanted from each other: exhibit teacher packets ready to copy; information for floor staff; and related activities.

Many of us were new to museums, and all of us were new to TEAMS. In the months that followed, I was floundering. My colleague from our partner museum was also feeling the frustration. Too many other priorities got in the way. Ten percent of my time was being spent on TEAMS 2, pushing other projects into the 320+ hours of uncompensated overtime I put in that year. There just weren't enough hours to turn the vision into reality, to assert the importance of education. With so many other concrete projects on my plate, what difference did a nebulous vision make anyway? I knew I'd finish the project somehow, but it would only be "acceptable." I could not work this long and hard and stay functioning. As a team of two we gathered and refined ideas, but the heart of the project was a luxury I couldn't afford.

The education process was reinvigorated in the spring of 2002. The museum directors pulled together a supplemental grant to allow education staff from each museum to gather for our own charrette. The purpose of this two-day session was for the TEAMS education staff to present and discuss each

museum's ideas for programming. Here we were to get enough feedback on and critiques of ideas from the whole group to help take these the next step at each museum. But this meeting served to provide more than that.

The most invigorating and bonding activity during this gathering was the initial defining of "educational program" as opposed to "exhibit experience." After that, these two days flowed and individual members melded into a true collaborative. Together, this network of museum education professionals could elucidate what it is that we do.

We agreed that, unlike most exhibit experiences, educational programming is all about personal interaction. Although these interactions vary in degree, they bridge the gap between formal and informal education. Museum programs are semi-formal and, as such, are structured to create informal learning. These experiences do not need to take place in the exhibit spaces, but are complementary to exhibits. Programs can draw on other media to clarify or enhance an exhibit concept. Programs can lay the foundation for understanding exhibit concepts or explore tangential concepts. Programs are designed to put together a series of experiences that bring out the concept so as to deepen the experience of visitors.

The rapidity with which we educators from different institutions came to consensus was refreshing and encouraging to me: we were all on the same page. We shared our frustrations and reaffirmed our faith in each other's abilities to work with minimal outlines and to adapt what each was given for each institution's individual needs. As professionals, all we needed was a programming "tool box" that contained good flexible curricula and whatever external supports were needed to have the programs come to fruition.

As we reviewed each other's materials and offered suggestions, a template was formed and defined. We agreed that literature tie-ins, math tie-ins, a bibliography, teacher workshop ideas and brainstorm ideas would be helpful. Because we shared time constraints, pre- and post-visit activities needed to be fully fleshed out and ready to Xerox, but in-house activities could be bare bones. We would design individual activities and stand-alone experiences that could be done in the exhibit spaces or elsewhere. Programs needed to be inherently interesting and well-implemented, but did not need to be tied directly to the exhibit. Instead, we could look for resonance within the exhibit and form a program link. And it was fine to use the same concept for different programs.

The write-ups for these activities could be minimal, but we agreed on key components that would be helpful:

- Title
- Overview / summary / concept
- Science content / background
- Related exhibits
- Time needed for the activity
- Age appropriateness
- Staffing (#, experience level needed; e.g. teen volunteers, professional educators)
- Safety issues / caveats
- Materials (supplied, required, sources, Web)
- Procedures (preparation, real time, follow-up)
- Extensions to the activities if time is available
- Related activities

These activities would be cross-referenced so each educator could pull activities as needed for concepts, time constraints, or audience needs.

Because of this meeting, we had the impetus now to do what we knew would be helpful to each other. We determined that the pre- and post- visit packet should contain a summary of the exhibition, brief descriptions of exhibits, and that there should be no overlap between programs intended for use at the museum and what was sent out to teachers. We agreed to have three sets of activities geared to grades K-2; 3-5; and 6-8. Although the same activities could be repeated in a different format at each level, this would streamline our work of getting the word out to schools. We decided to connect our programs to the National Science Education Standards and to write these standards out to assist museums in linking to applicable state standards. To make it even easier, we would put the teacher packet on a CD so each museum could edit for individual museum logos and state standards.

I felt I had received a transfusion. This plan was doable, and worth doing. Now we had criteria to follow and my faith in museum education was renewed. Our activities would be experiential and open-ended; at the same time, we agreed we would do a few things well and connect program experiences to everyday life. Even the practical tips made sense, such as using sheet covers to avoid holes, because we all knew we would copy like crazy.

When education staff from the museums met at the ASTC conference in the fall of 2002, we were sailing together toward the same goal. There was an understanding now of what was expected and

confidence in one another that each finished product would be beneficial to all.

Sailing was not always steady in the spring of 2003 as the deadline approached. Down two out of three staff members in two months, starting another major project, and coming into our busiest season, I had time only for crisis management until April. The education end of our TEAMS 2 project would have sunk without a reliable coworker in a partner museum. With a few weeks to go, I was able to free up additional staff to format, print, test and assemble curricula. As many projects go, we worked extra hours more than a few times, but met our deadlines. And, more than merely “satisfied,” I am happy with the results of this true team effort.

Because of the charrette, I knew what to expect from each museum’s program binder, and could adapt ideas as I needed. Feedback to and from partners was more frequent during the months when exhibits first went on the road, but it was good to give and receive positive information about what we had accomplished. And now that I know what I’m in for, I’m ready to do it again.

The Relationship Triangle: Exhibits and Education Staff Working With Visitors in Exhibit Development

RICH SMITH AND CALVIN UZELMEIER, ROCHESTER MUSEUM & SCIENCE CENTER

Rich Smith has served at the Rochester Museum & Science Center from 1994 to the present and has been associated with the TEAMS Collaborative since 2000. He is currently manager of interactive development. Calvin Uzelmeier began with RMSC as a volunteer in 1998 and has worked at the museum since 2000, first as physical sciences specialist and currently as manager of exhibit and floor programs; he has been associated with the TEAMS Collaborative since 2000. Their essay describes how their participation in TEAMS led to a process for increasing the use of visitor feedback in developing both exhibits and educational programs that has had a systemic impact throughout their institution.

Partnering exhibits and education staff in science exhibit development is not a new idea, but was new to the Rochester Museum & Science Center (RMSC) when the TEAMS 2 Collaborative began. Because we had little experience in designing our own science interactives, we were eager to enter into the TEAMS 2 project as a mentored partner with Sciencenter in Ithaca. Our goal was to develop staff capacity so we could make progress on the strategic goals of bringing science and technology interactive experiences

forward in our museum. In order to develop strong interactives, we learned we needed to strengthen the triangular connection between the exhibit, the visitor, and the exhibit designer or educator. But, which of us, the designer or the educator, belonged in this connection? That was a question that we needed to explore. We decided to partner two staff members to make up the RMSC team: Rich Smith, a seasoned RMSC designer without much background in the physical sciences, and Calvin Uzelmeier, an RMSC science educator with no previous museum or exhibit building experience.

TEAMS 2 was a real learning experience for us. Rich as a designer had a tendency to design in a shop environment, while Calvin, an educator, was more in the public eye, in the classroom and on the museum floor. During TEAMS 2, we learned that we needed to work in each other’s areas so that we could see firsthand how interactives are developed, built and evaluated. In the end, we each found comfort in the other’s work environment and learned that exhibit development was not done in one place or the other, but rather, was found in both.

Despite our developing a stronger working relationship, differences still emerged at times where no easy compromise could be found. It was then that we were reminded to depend on a third voice in the development process: the visitors. Our TEAMS 2 partners, the Ithaca Sciencenter and evaluators from Inverness Research Associates helped guide us as we made the transition from “finding the right answers” to “asking the right questions.” Our mantra soon became: “It doesn’t matter what we think, it matters what the visitors think.” As the prototyping process got underway, we discovered visitors created different experiences than we had expected. Consequently, we continually changed the look and arrangement of the interactive elements to create a cohesive and understandable experience. We quickly found ourselves watching and listening to the visitor to learn how they approached each interactive so that, through an exhibit’s design, we could make each experience as positive and thought-provoking as possible.

An example of this is an interactive called the Dancing Wall where visitors moved in front of a structure that had motion sensors installed that created a sound and light show. The first prototype was built to be attached to a gallery wall. Consequently, visitors recognized it as a climbing wall exhibit, and began climbing! We reevaluated the look of the piece and created a shape that was free standing and round in shape.

This changed the focus from climbing to “dancing,” which was the goal. Then the open-ended possibilities at the Dancing Wall could be explored and visitors could follow their curiosity.

As we came to understand the impact of the visitors’ voice in exhibit development, we knew that a process needed to be created which would ensure their voice was a part of every exhibit that we built. In order to help bring what we have learned to the rest of the RMSC, we found that documenting each step of the exhibit development process is critical. We developed a document that states the original idea, and includes evaluation reports for each stage of prototyping, label copy drafts, and drawings to show how things might look. This helped us to move forward and not revisit concepts that did not work, or that the public did not embrace.

This momentum has carried us beyond the TEAMS 2 project to new interactives we are developing at the RMSC. Partnering exhibits and education staff in exhibit development has become more common. Where the Education and Exhibits Departments at the RMSC were once worlds apart in their approaches, using the visitor as the deciding judge has helped forge a stronger relationship that incorporates each of our strengths into a common “voice” on the floor. Best of all, we have learned we are all developers.

An Educator Learns to Think Like an Exhibit Designer: How “People People” Can Learn to Think Like “Stuff People”

JIM TAYLOR, PROGRAMMING; THE HEALTH ADVENTURE

Jim Taylor has served as director of programming at The Health Adventure from 1989 to the present and has been associated with the TEAMS Collaborative since 2000. His essay describes the transition at his institution in which education and exhibits staff each learned more about what the other did, gained respect for each other’s work, and ultimately brought about changes that benefit visitors as well as the institution.

The Health Adventure began as a teaching center in 1968, and did not open to the “walk-through” public until 1992. Naturally our education department has an orientation to educator-directed learning. Until we began work on *Body Carnival* through TEAMS 2, I’d taken exhibit design pretty much for granted; I knew what I liked, I knew what seemed to work well and engage visitors, but I’d never put myself in the role of a designer. I watched traveling exhibits come

and go, and I had my favorites—but mainly in the context of, “What demonstrations and programs can we teach to augment this exhibit?” I thought of myself as one of the “people people” and the exhibit staff as “stuff people.”

We educator-types would also ask ourselves, “How well does this exhibit (by itself) engage, entertain, and teach?” If an exhibit needed more copy, we added it. If it looked boring, we added some colorful banners. If it offered too few hands-on activities, we added a few. If it needed an “Explainer” we made sure we scheduled someone to be in the exhibit to assist and engage the visitors. By the time a traveling exhibit left our museum, we usually had definite opinions about how it could’ve been better “if only we’d designed it.”

It’s much easier to critique than to create. The task of creating an object which can attract people, engage their hands and minds, and actually teach them something worth learning—without being easily broken, misunderstood, or downright unsafe—is quite daunting! As I participated in the designing of *Body Carnival*, I had to let go of many educator assumptions and re-learn what a “good exhibit” really means.

The first illusion I had to let go of was that museums could always (or in some cases, ever) have a dedicated staff person in an exhibit to work with visitors. Many smaller museums simply lack the resources to dedicate a staff person to each gallery. Therefore, the exhibit itself must first attract, and then engage, people. It can’t teach or entertain if nobody approaches it. With *Body Carnival*, we opted for bright colors, a “midway attraction” look, and even placed a graphic “Carnival Barker” on the copy panels. The units practically shouted, “Come look at me!”

Of course, staff persons in an exhibition do more than engage; they can also protect the exhibit from the visitors, and the visitors from the exhibits. It was amazing to learn how “bulletproof” exhibits designed for children must be. People don’t simply press buttons—they smack them. I came away from this process with a new appreciation for “materials science,” as well as confirmation of the fact that children will interact with exhibits; it’s the designer’s job to make the appropriate interaction more engaging than the inappropriate (or destructive) interaction.

The old plan of “adding copy” to make interaction easier was another early casualty of the learning curve. A teacher’s natural impulse is to explain, and if at first you don’t succeed—explain some more! But the most thorough explanation is useless if nobody reads it—and extensive copy can be a real turn-off to many visitors. We ended up researching, writing, and

then editing, editing, editing, editing...and then editing some more. In the case of copy, less can definitely be more. We also learned the importance of prototyping copy. Asking visitors, "What does this mean?" can be a real eye-opener. Sometimes we'd think we'd achieved the perfect balance of thoroughness and brevity only to discover that a great many visitors had no clue what we were talking about. We went back to the drawing board again and again. We went through many printer cartridges.

TEAMS 2's overarching concern with accessibility was a real eye-opener, regarding not just *Body Carnival*, but the entire museum. As a teacher, one should always be aware of varied learning styles, comprehension speed, and physical obstacles to communication among students in a presentation. Thinking about exhibits themselves in this way was new for me. Design features such as wheelchair height, high contrast in signage, and audio description seemed so obvious during the design workshops—but during a walk-through of our existing galleries, I couldn't help thinking, "If that accessibility stuff is so obvious, how come we've got so much of it wrong?"

It also became clear that anything we did to improve accessibility for our visitors with special needs also improved the experience for everyone else. Once again, prototyping with target audiences was extremely helpful. It was fascinating to accompany groups of persons with low vision, or in wheelchairs, through both our *Body Carnival* prototypes and then the rest of the museum. We learned so much we've embarked on a project using volunteers to contact local families with special needs, escort them through the museum, and then conduct focus groups with them seeking more ways to improve the museum experience.

Visitor safety is another area that educators don't spend a lot of time thinking about. When thinking like an exhibit designer, this is one of the basics. In *Body Carnival* design meetings, we spent hours discussing ways to protect visitors' fingers from pinch-points, their ankles from the balance beam, and their toddlers' heads from sharp corners on exhibit cabinets. I was afraid we were being overly cautious—until I watched the prototyping sessions. Whew!

I came away from this process with an enhanced respect for the science, art, and craft of exhibit design. I also hope that having educators involved in the design process from the beginning was helpful to the exhibit staff. To me, having both the "stuff people" and the "people people" involved from the very beginning makes for an exhibit that has a better chance of achieving excellence in attracting, engaging, and instructing a wide range of visitors.

TEAMS Collaborative Provides Forum for Sharing "Best Practices"

KEVIN COBURN, PUBLIC RELATIONS, MONTSHIRE MUSEUM OF SCIENCE

Kevin Coburn has served as manager of public relations at the Montshire Museum of Science from 1994 to the present and has been associated with the TEAMS Collaborative since 1996. His essay describes the value of the Collaborative in providing a forum for marketing staff to exchange promotional ideas.

Marketing and public relations staff who have worked at small science centers for any length of time can quickly draw up a list of most frequently asked questions posed by potential visitors. Reduced to their barest essence, many queries can be summed up as: "What's new at the museum?" Visitors may feel as though they have thoroughly explored their local science center—they have seen everything there is to see. Offering traveling exhibits is an important way for museums to provide new and varied experiences to their audiences. The TEAMS Collaborative has provided marketing staff at participating Museums with opportunities to entice visitors to return again and again.

As TEAMS marketing staffs discussed ways to promote the new exhibits being developed, it became clear that a standard approach to providing photographs, press releases and other media was necessary. However, promotional strategies at each institution had evolved in response to the particular market conditions existing there. The challenge for TEAMS marketing collaborators was to identify and produce promotional materials essential for each exhibit, while not ignoring needs specific to each market. The result was a kind of "collaborative within a collaborative," where public relations staff could share their own expertise and best practices and, in turn, learn about new ways to market their museum from colleagues.

The TEAMS 1 and 2 Collaboratives were established when the Internet was a rapidly developing medium, and many non-profits were struggling to harness its potential. The Montshire Museum of Science was able to contribute experience that grew out of its relationship with ValleyNet, a local Internet service provider the Museum helped establish. Bob Raiselis, an exhibit developer working on TEAMS projects at the Montshire and a part-time employee of ValleyNet, built a web-based framework for sharing TEAMS marketing resources. Museum public relations staff submitted materials in digital format to be posted on a TEAMS marketing website. Graphics, photographs, exhibit descriptions, and press releases

could be downloaded quickly and easily. In the late 1990s, TEAMS 1 marketers struggled with logistical questions of how to develop and exchange physical data. (Should photos be in black and white or color? How should text exchanged by “snail mail” on floppy disks be formatted?) New possibilities offered by the Internet during the TEAMS 2 Collaborative changed these discussions considerably. The TEAMS marketing website not only offered convenient and cost-effective ways to share resources, but also helped public relations personnel become more savvy in using the Internet as a marketing tool.

At the time of TEAMS 1, the Discovery Center Museum in Rockford, Illinois, had developed successful relationships with local television stations that broadcasted 30-second public service announcements promoting museum exhibits and events. Other TEAMS partners had not fully explored this possibility. Largely due to the success of the Discovery Center, TEAMS public relations representatives agreed to include enough raw “B” roll footage for local television stations to produce a 30-second spot. Success in this area was uneven. In some markets, TV stations would not accept film unless it was supplied by their own camera crews. Other museums in rural locations simply did not have local network affiliates to work with. But some TEAMS museums used this tool to gain valuable television exposure in their respective markets.

Among other promotional efforts, staff at the Sciencenter developed successful public events to draw attention to early TEAMS exhibits. When the exhibit *Clothing: Science From Head to Toe* appeared in Ithaca, New York, staff developed a public demonstration featuring a Volvo station wagon being lifted by a crane—the car was suspended entirely by denim fabric featured in the exhibit. Besides demonstrating the tensile strength of the fabric, the event attracted widespread local and national attention, including a segment on CNN news. With encouragement from Sciencenter staff, marketing partners in the Collaborative decided to include event ideas that could be packaged along with other marketing materials. TEAMS participants were then free to tailor these event ideas to their specific audience. The Discovery Center Museum invited athletes from local professional minor league franchises to do programs to promote the exhibit *Team Up! Explore Science and Sports*. When this exhibit came to the Montshire, athletes from Dartmouth College teams made public appearances at the museum.

For small museums, opportunities for marketing professionals to exchange ideas with colleagues are few and far between. TEAMS provided a forum for this dialogue to take place, with the result that mar-

keting personnel learned new skills and marketing ideas that are transferable to other areas of museum promotion.

Communicating Your Way Through Exhibit Development Partnerships

WILLIAM KATZMAN, CATAWBA SCIENCE CENTER

William Katzman has served as director of exhibits at Catawba Science Center from 1997 to the present and has been associated with the TEAMS Collaborative since 1997. His essay touches on the importance of close communication between partners who share the responsibility for designing and building a joint exhibition.

Every museum has its own style of exhibit creation. What happens when you mesh two styles that don't seem to fit together? You get a new style—one that abandons old methods but keeps the interior concepts. At first Catawba Science Center and The Health Adventure's collaboration seemed to stumble, then it got bogged down in esoteric details, and finally, it got on track (but even when on track there were meanderings).

A typical collaborative meeting between Catawba and The Health Adventure included two to three staff members from Catawba and three to five staff members from The Health Adventure. This personnel imbalance was not detrimental to the collaboration, but it reflected how each institution approached exhibit development. The Health Adventure utilized educator committees as well as an external oversight committee to generate and develop ideas, while Catawba utilized individuals as well as an external oversight committee. Although over-simplified, I think Catawba had a pyramid approach to management and exhibitry, while The Health Adventure had a circular approach. In addition, there were differences in the approach to and styles of exhibitry in the two museums—Catawba Science Center's exhibits tended to be more “hard science-oriented” than those at The Health Adventure. We hoped this difference would help us create better exhibits.

WORKING TOGETHER: EMOTIONS AND ATTITUDE

The differences between the two museums were further exemplified when differences in communication styles between staff members became apparent at the first few meetings. We dealt with these differences head on at Catawba, checking each other's body language at meetings and making sure that we toned down or eliminated negative signals that might cause The Health Adventure staff concern.

During this time we spent several meetings generating and refining ideas for the “storyline” of the exhibit. We knew we were building an exhibit on the Physical Science of the Human Body, but The Health Adventure was yearning for a storyline to wrap this exhibit in. Although our director didn’t care for the “storyline” idea, he went along with it. Again, this typified our different exhibit development processes: Catawba is primarily concerned with the exhibitry first and later deals with the graphic and exhibit themes, while The Health Adventure wanted to start with the graphic and exhibit themes, and work the exhibits around those themes.

We generated the “storyline”—which we discarded after the exhibits charrette. Although we could have moved forward faster without this additional phase, by talking about this storyline, and agreeing to it, we probably generated a more open means of communication. So although the subject matter may have been a waste, the process of agreeing to the subject matter was not.

WORKING TOGETHER: EVEN AS YOU WORK APART

We ended up with each museum taking over particular exhibits for the prototyping and design phases. However, each exhibit idea was to be agreed upon by the committee with latitude for changes based upon how the prototyping went. This resulted in individual people building and testing their prototypes. Ideally, we might have done more cross prototyping—testing exhibits at both museums more often than we did—but the time constraints precluded this as a feasible option.

One of the problems with this process is a lack of communication—such as when an exhibit is changed prior to final production without the knowledge of the other group. This is much more likely to happen if the exhibits are developed independently. The first time it happened to us, I heard from the outside fabricator that they still needed the horns for the factoid clown signs. Horns? I was surprised—I didn’t know of any horns on the clowns. The clowns were a part of our new exhibit theme—they carried signs that had facts about the human body. Apparently, The Health Adventure staff had decided to add this element to the final design (after our group prototyping sessions)—only we hadn’t been informed of this change. What to do? We didn’t like the idea—the extra sound of honking horns may attract kids to the exhibit, but we felt that the honking horns would drive our floor-staff crazy—not to mention the parents who might be trying to read the signs.

We responded by asking if the horns had been prototyped—floor tested—because we worried also about the durability of the rubber bulbs on the

horns. They responded that indeed the horns had been tested. We realized that as long as the horns were durable, **if** they were too annoying we could alter them later, ensuring that they couldn’t produce sound. So the exhibit was created with horns.

During the opening the horns busted within the first hour—at both venues. We got rid of the horns, making the whole issue a “non-issue.”

A second change was based on an isolated decision during the exhibition’s first time on the floor. The goggles in one exhibit were never being hung up on the intended hook—they were normally ending up in a bin nearby. So I took an extra bin I had, and put it underneath the hook. Suddenly the goggles were being returned at a better rate. As such, I asked for a quote on building a box to go underneath the hook. I did not inform The Health Adventure of this until our next meeting—we hadn’t contracted for it yet. The Health Adventure didn’t like this approach, they felt a bigger hook would be better—only none of us could find a sufficient hook. But we could build one. So we had the fabricator build both. The bigger hook did work!

These last two problems occurred due to a lack of open communication, and the feeling that each museum had of ownership. Perhaps two of the most important things to remember in any collaboration are:

- 1) Communication is of key importance. Simple carbon copies of emails are fantastic.
- 2) Neither organization fully owns any piece of the exhibit. Each may be responsible for certain pieces, but how those are changed affects the whole exhibition—and no matter who gets the exhibit in the end, each museum has to be happy, or at least be able to tolerate **any** change.

Record-Keeping and Documentation of Traveling Exhibits

KATHLEEN R. KRAFFT, DIRECTOR OF EXHIBITS; SCIENCENTER

Kathy Krafft began volunteering at the Sciencenter in 1991 and since 1995 has served in the positions of exhibits coordinator, exhibits manager, and director of exhibits. She has been associated with the TEAMS Collaborative since 1996. Her essay addresses the types of records that should be kept to document exhibit projects and the value of such documentation in saving maintenance costs and providing superior customer service in the future.

This topic for “lessons learned” arose from a conversation with Tom Prendergast, who did almost all the development and creative work on our end of the

Cool Moves exhibition. He was expressing his gratitude to me, yet again, for keeping track of all parts and sources and construction through the development of *Cool Moves*. I've saved him several hours, or more, of trying to figure out which bearing he used, which size hose was used, where the pump came from, etc. This has saved him embarrassing phone calls to museums hosting our exhibit, asking them to measure diameters or read off part numbers. It has also helped during technical support phone calls, as the host museum can look at photos (either in the technical manual or others that are emailed) as both sides work together to solve a problem.

KEEPING TRACK OF PARTS AND SOURCES

1. I usually copy the catalog page(s) or print out the webpage(s), and highlight the part information, then file that with the exhibit folder after the order is placed.
2. I photocopy every receipt before turning them in to our accountant AND write on the photocopy which part goes with each exhibit, etc. At our museum, I collect and turn in all exhibits receipts, so that means we have a complete set and I've seen them all.

I do this for hardware, tubing, laminate (formica), paint colors, bearings, latches, plumbing parts, electrical fittings, etc. The only exceptions are for more general supplies, such as duct tape, sandpaper, etc. *You may think you'll remember all these details, but a year or so later you'll find the details are fuzzy.* I find it most efficient to store up the receipts on a clipboard and do the copying/turning in every week, and then file the receipts and catalog pages all at once.
3. I file the photocopies in separate folders for each exhibit; sometimes I use multiple folders for an exhibit if it is complicated (e.g., one folder for plumbing parts, another for the metal frame and painting, etc.). Each exhibition has a different color file folder to help in keeping track of multiple projects, and is stored in a separate file drawer(s); the open plastic crates designed for hanging file folders can make it easier to find and use the file folders, although somewhat hazardous to get to your desk!
4. At the end of the project, I sort out the parts into one file with final parts and sources, and another file for prototype and development—one for the final, traveling exhibit, and another in a file documenting the development process for the exhibit so I have a history of other parts tried; this also creates a history and place to keep track of prototypes and/or parts that didn't make it into the final

exhibition. I often also have some notes on the exhibit development, say from brainstorming sessions with our exhibits committee. This can also be handy if you have parts that are left over and want to use them in a different project; then you have some hope of figuring out where they came from. Again, you need to do this shortly after the exhibition ships, as otherwise you may not remember which thickness of rubber you finally ended up with, or which blower, or....

5. I also measure sizes of each finished cabinet as we don't normally have blueprints, and may not even have pencil sketches, and include that in the exhibit files.
6. I systematically note hardware used for any access panel, trim, assembly, etc. (type, length and size) as they DO seem to get lost during travel; this information is placed in the exhibit file folder, and is included in the technical manual so host museums can quickly locate the appropriate spare parts.

PHOTO DOCUMENTATION

I have quite the reputation for being a pest with a digital camera, particularly as exhibits are set up for the first time, or packed up for the first time; this is my last opportunity to document the FINAL sign mounts, any changes in wiring, etc., as well as the blankets or crates, and how the parts are packed and loaded, for the technical manual. Make sure the camera is convenient—it's worth a few hundred dollars to have one handy. I take:

1. Photos of all prototypes, which make a wonderful history and story to be shared on occasion with others (low resolution digital photos are fine). I might also document testing, e.g., by accessibility testers, for project records. From time to time, I also insert the photos into a Word document with a brief note on each, and print the photos out to go in a binder with a section for each exhibit; this makes a nice visual story to share.
2. A good set of final photos of each exhibit with digital camera (high and low resolution) and 35mm print film; handy for marketing folks later, in addition to any photo they had professionally shot with kids/adults. I take one each at least for every exhibit without visitors to block the view, and several with visitors if possible as then they look like they are having fun at your exhibit!
3. Digital photos of the outside and inside of each exhibit, any hidden construction details, access panels, parts in place, electrical connections,

mounting hardware, etc., before the exhibition leaves the museum.

4. I document with digital photos any modifications to purchases, such as disabling a button on a weight scale; it helps to label the photos well, especially if you don't promptly get around to incorporating the photos into a Word document with notes.
5. I photograph EVERY step in setup/takedown and packing of each exhibit, including a general photo of the parts on the floor ready to begin assembly.
6. I will also take a series of photos for the trouble-shooting part of the technical manual—how to take apart the knob, or change the bulb in the strobe, or things of that nature that might come up while traveling.

Minor bit of advice: get a simple card reader (\$15 for compact flash cards), so you can pop the cards in the camera into the reader and use the card just like a regular floppy disk or whatever which lists all the photos sequentially; having to rely on the camera software and slower connections is really tedious.
7. Filing photos: Each exhibit will have a separate file folder on my computer for digital photos. There's usually a subfolder of "final photos" and one of "prototype photos" which are helpful categories. I create other subfolders for categories such as "setup and assembly" if we take a sequence of photos for the technical manual, or "final plumbing" if that is a major step and worth keeping separate. Good subfolders allow you to then label the photos with the key information for which you took the photo, without having to say, for example, "wind over water prototype" every time, when the gist of the photo is that you tried a new location for the label. I promptly label each digital photo as to its key feature ("routing corian trim 1" or "computer connections made") and file them by exhibit.

This saves a HUGE amount of time in writing a good technical manual—a picture (with perhaps an arrow added) is worth a thousand words, and makes for happy staff at host museums.

OTHER RECORDS

I have file folders for other records too, such as:

1. Ongoing lists of exhibit ideas (we had roughly 200 for Cool Moves, in an excel sheet).
2. Budget documents: planning, and actual expenses.
3. Notes from evaluation sessions. Sometimes I'll save drafts of signs too, so I can go back and look at how the exhibit sign evolved.

4. Project planning, timelines, copies of the proposal, etc.
5. Collaborative documents, such as tour schedules and shipping, exhibit and facility guidelines, etc

Internet Technologies for Collaboration

BOB RAISELIS, EXHIBITS; MONTSHIRE MUSEUM OF SCIENCE

Bob Raiselis has served as an exhibit developer and IT professional at the Montshire from 1996 to the present and has been associated with the TEAMS Collaborative since 1996. His essay documents a number of technology-based communication strategies tried by the collaborative and underscores the value of having professional IT support to maximize the ability of a collaborative to maintain high-quality communications among its members.

It seems hard to believe, but at the beginning of the first TEAMS Collaborative, email technology was new to many of the participants. In spite of this, it was clear from the very beginning that facilitating collaboration between the staff members of five small museums scattered over half of the country would mean taking advantage of any available technology that would be accessible and affordable.

We were fortunate that the Montshire Museum had a very good relationship with a local community-based Internet Service Provider. ValleyNet⁵ has offices in the same building as the Montshire Museum, had its beginnings in conversations between the Montshire Museum and Dartmouth College, and shares one staff member with the Montshire Museum (me). This close relationship allowed us to use Internet technologies that might have been harder to experiment with otherwise.

To facilitate the exchange of information between Collaborative groups, we set up several listservs. A listserv allows several people simultaneously to receive an email message sent once to a special list email address; listservs are usually set up in a way that limits who can send and who can subscribe. We used a free piece of software called Macjordomo to operate the listservs on our server. This software allowed us to set up separate lists for the directors, exhibit designers, programming staff, and public relations personnel. Later in the process we added a group list, so that everyone in the Collaborative could be emailed by sending a message once to a single address. These lists were not public lists; I added and deleted staff members from the distribution lists, usually responding to requests from the directors.

⁵ <http://www.valley.net>

Email lists were and are used sporadically; there were bursts of activity (several emails in the course of a week, perhaps) when exhibit staffs were getting ready to test prototypes, or when programming personnel were developing standards, and then there were periods of no activity for several weeks (or months).

There was also a TEAMS website for the first Collaborative, which I designed and managed. The original thought about this website was that it would be a repository for original grant application materials, contact lists, and schedules, and a place where everyone could see descriptions and photographs of ongoing work by each of the exhibit and programming teams. Comments about the materials on the website could then be shared using the email lists.

This scheme suffered from the fact that there was only one person who created, edited, and uploaded web pages. Any change in the website (new prototype photographs or descriptions, programming documents, exhibit schedules) had to be handed or emailed to me; I made the changes and posted the information to the website, making editing and formatting changes as I saw fit. It was a lot of work for me, requiring quite a bit of back and forth to confirm that what I posted to the website was what the person who requested the modification or addition wanted.

Around the beginning of the second TEAMS Collaborative, I was experimenting with a new web server program for ValleyNet, with the thought that it might be a useful tool for organizations that needed a web presence but lacked the means to hire a website designer. Frontier,⁶ a product of Userland,⁷ began life as a scripting application for the Macintosh operating system, but grew into a full-fledged content management system (CMS) called Manila.⁸ It keeps track of web pages in a database rather than in individual files, and allows for editing of each web page within an editing window in a web browser.

Once the overall template for a website is designed and created, anyone can be designated an editor of that site and can make changes, add pages, and add photographs and documents. The aim of a content management system is to separate the design and editorial work on a website...this seemed a perfect match for the TEAMS Collaborative website needs.

ValleyNet agreed to allow us to set up four collaboration websites, one for each of the exhibit projects. I designed the sites and set up a standard set of pages (Exhibit Prototypes, Evaluation, Programs, etc.) and

with just a little bit of instruction the individual exhibit developers and education staff members were adding descriptions and photographs of their work.

The evaluators at Inverness Research⁹ also had editorial privileges on each of the collaboration websites, so that they could add evaluation notes specific to each exhibit project.

After a few months of this it seemed clear that the ability for other Collaborative members to be able to post comments about ideas presented on each of the websites would be a welcome addition, and we added a plug-in called CommentIt¹⁰ to the Manila server. This allowed anyone visiting the website to post a comment specific to each webpage right on the page itself. In terms of making comments on specific prototypes, programming ideas, and label tests, this was a very useful addition; a back-and-forth dialogue could take place in text adjacent to the label, description, or photograph, with anyone visiting the page able to participate.

It should be noted that there was also a TEAMS 2 website¹¹ with a more public face, containing information about the Collaborative, texts of the original proposals, schedule information, and contact information for the principals, among other information. The Collaborative work sites were not made public (not linked from anywhere in the TEAMS 2 website) and I don't think anyone but Collaborative members ever saw them. This meant less of a sharing with the general museum community, but allowed Collaborative members to be far more frank than they might have been in a more public setting. Once the exhibitions were on tour I added final exhibit descriptions and photographs, programming information and documents, and marketing photographs to the public TEAMS 2 website so that interested members of the museum community had access to that information.

Towards the end of the prototyping period for the second TEAMS Collaborative, we tried one more means of enabling members to share ideas. We set up one of the internal TEAMS web pages with a number of pre-named AOL Instant Message chats (so that with a click on the link,¹² you joined a chat session). Once everyone installed the chat software (either the AOL AIM software or the newer Apple iChat program) and signed up for a screen name if they didn't have one already (these are freely available from AOL),

⁶ <http://frontier.userland.com>

⁷ <http://www.userland.com>

⁸ <http://manila.userland.com>

⁹ <http://www.inverness-research.org>

¹⁰ <http://www.baylys.com:8080/manila/plugins/commentIt>

¹¹ <http://www.montshire.org/teams>

¹² formatted as `join exhibits chat`

regular online discussions were held. The exhibits staff, for example, “met” regularly every Tuesday afternoon for almost three months as we moved from final prototypes to fabrication of exhibits, a time when last-minute decisions on materials and design benefited from discussion with colleagues. We archived the texts of some of these discussions so that absent members could catch up on discussions they missed.

The process we used to take advantage of new opportunities afforded by changes in technology was far from scientific, but we managed, with a minimum of expense and only a relatively small investment of time, to create several systems by which Collaborative members could converse, comment, and discuss their work. It’s clear that each has its strength: email lists for general announcements and dissemination of documents; websites for more thorough presentation of text and photographs, allowing ongoing discussion of specifics; chat-room discussions to maintain the social interaction that is so important among working groups. The technologies we used were straightforward and served their purpose, not requiring large upgrades of each museum’s technology infrastructure, nor did they have a large learning curve for the Collaborative participants.

SECTION 6

Investing in Small Museums: The TEAMS Example

This policy briefing presents a summary of the evaluation of the Traveling Exhibits At Museums of Science project (TEAMS) conducted by Inverness Research Associates¹³ over the past ten years. More broadly, it discusses the need for and benefits of NSF investment in collaboratives involving small science museums.

SUMMARY

The NSF's investment in the TEAMS Collaborative appears to have been sound.

The TEAMS project represented a major grant for each of these small institutions, and thus it received a significant amount of attention from the museum directors as well as exhibit, education, and marketing staff. The imprimatur of the NSF funds allowed museums to leverage those dollars productively. Several museums went on to write successful proposals for additional projects supported by the NSF and other funders. Participating in this national-level project gave TEAMS museums credibility, and helped them gain local and national support for their institutions.

In addition, we think the fact that the NSF invested in TEAMS for three funding cycles allowed for a type of longitudinal developmental work that is all too rare. The re-investment in basically the same group of museums supported a cumulative building of capacity over approximately ten years and across a range of domains. Both as individual institutions and as a group, they were simply better the second time around. Now the TEAMS Collaborative is poised to take the assets created in the first two TEAMS grants and to put them to work in TEAMS 3.

We believe this collaborative is a good example of measured and thoughtful investment by the NSF, a longitudinal approach that builds upon and puts to work the return of its previous investment. This investment is exemplary in that it provided funding for cumulative development that stretched over three grant cycles that spanned a dozen years. And it suggests that the NSF may well want to examine ways to foster other such collaboratives involving small institutions.

The NSF's investment ultimately was not just about strengthening a group of institutions. It also led to significant development of the individual practitioners, who now are in a stronger position to contribute to the field. They are doing this not only through their

exhibitions and programs, but also by sharing their experiences in conferences and workshops, and by reviewing proposals for the NSF. Regardless of where the careers of TEAMS participants take them in the future, they will serve the science museum field through an enhanced ability to create rich interactive exhibit and program experiences.

In the meantime, TEAMS continues to build on what it has already accomplished; we anticipate the group will continue to find ways to contribute to the small museum community as well as the broader field of exhibit developers and informal science education researchers.

THE CHALLENGE

The number of science centers in the United States has grown rapidly in the last 10 years.¹⁴ Association of Science-Technology Centers (ASTC) members are located in every state in the U.S.¹⁵ ASTC (2001) calculates that 120 million people visit public science-technology centers in the United States every year, a figure based on visitor counts at the Association's member institutions.¹⁶ This is consistent with National Science Foundation (2000) survey data indicating that 61 percent of adult Americans visit an informal science institution (i.e., zoo, aquarium, science center, natural history museum, or arboretum) at least once a year.¹⁷

Science centers comprise an important part of the science education infrastructure in the United States. ASTC argues:

"Furthering public understanding of science through experiential learning is at the heart of the science center mission. Science centers offer rich resources for lifelong learning, providing meeting places for citizens and the research community, supporting schools, and contributing to the cultural and economic vitality of their communities."¹⁸

This infrastructure not only provides opportunities for millions of people to learn science in an informal setting, but it also contributes to the improvement of formal education in increasingly important ways.

¹⁴ ASTC Sourcebooks of Science Center Statistics, 2004. Association of Science-Technology Centers Inc., Washington, D.C., p. 9

¹⁵ ASTC Sourcebooks of Science Center Statistics, 2004. Association of Science-Technology Centers Inc., Washington, D.C., p.5

¹⁶ Approximately 350 science centers in the United States are ASTC members. See <http://www.astc.org/about/members.htm>

¹⁷ National Science Foundation: Science and Engineering Indicators 2000. Appendix Table 8-34.

¹⁸ ASTC website <http://www.astc.org/resource/case/index.htm>

¹³ <http://www.baylys.com:8080/manila/plugins/comment/tt>

In a study of informal science education institutions and their service to schools,¹⁹ three-quarters of the institutions participating in the study have initiated programs that serve their local schools. On average, they devote 5% of their overall operating budgets to these programs, which include but are not limited to student field trips, teacher institutes, special events, and coaching and classroom support.

Science centers thus contribute to the public and to teachers and students in important ways. For this reason it makes sense for the NSF and others to invest in this infrastructure. Such investments can be highly leveraged as they create an ongoing capacity for science education in the informal, semiformal and formal domains. Investments that increase the capacity of science centers can bring multiple returns for decades.

But it is not necessarily a straight-forward process to invest in the science center field. Museums need to have certain capacities already in place to use NSF and other funding well, and the museum field is highly skewed in its distribution of museums—both in terms of their size and capacity. Of the approximately 350 science centers in the United States who are members of ASTC, there are perhaps a few dozen that have the capacity required to engage in high-quality exhibit design, development and dissemination. Such work requires scientific expertise, design expertise, evaluation knowledge, program design, financial resources and marketing abilities. Most science centers are small, local institutions that lack the staffing, facilities, and financial resources to produce and disseminate high-quality exhibits and programs. Hence, there has been a large market for traveling exhibits and curricular programs within the community of small museums.

Typically it is the large museums that have been building the traveling exhibits. NSF grants that support the development of such traveling exhibits do indeed contribute to the ability of small science centers to serve their local populations when these projects result in smaller exhibitions for rent or provide physical exhibits to small museums; however, such grants may not ultimately do much to build small museums' long-term capacity to design, build, and evaluate their own exhibits and provide rich science learning experiences for their visitors. In fact, this approach ultimately can lead to the "rich getting richer" and widening of the gap between the few high-capacity centers and the rest of the field.

¹⁹ See "An Invisible Infrastructure: Institutions of Informal Science Education." This is a 2-volume report resulting from a study of informal science education centers in the U.S., conducted by Inverness Research Associates. Association of Science-Technology Centers, Washington, D.C., 1994.

Ideally, the NSF and others would like to build the capacity of the science center field so that more and more institutions are capable of contributing to the quality of work done by and for science centers. Having expertise and capacity distributed more evenly would strengthen the overall field. But the NSF has a national focus and mission, and it is hard for the NSF to justify projects that are small-scale and serve only local audiences. As a result, it is very difficult for small museums to compete with large ones for NSF funding. Consequently, to build the capacity and distribute expertise more evenly, the NSF and other funders need to help create arrangements that allow them to invest in small museums such that the return on investment is equivalent to investments in higher-capacity institutions.

The funding of collaboratives of small museums may be a promising approach to such investments. Such arrangements make NSF funding a greater possibility for small museums. It also enables the NSF to reach museums and audiences it has not previously served, and helps build museum capacities directly in ways not possible through traveling exhibits.

The TEAMS collaborative is an example of such an arrangement. It is a funding approach that creates collaborative mechanisms for building both collective and individual capacity in a group of small museums—capacity that can reside within the participating museums long after the grant is over.

THE TEAMS COLLABORATIVE

The TEAMS collaborative consists of a group of seven museums that received NSF funding to build four traveling exhibitions which would rotate amongst the group and then be made available, through ASTC, to small science museums across the country. This group of seven museums includes four which had been funded as a first-generation collaborative by a previous NSF award:²⁰

- Catawba Science Center in Hickory, North Carolina
- Discovery Center Museum in Rockford, Illinois
- Montshire Museum of Science in Norwich, Vermont
- Sciencenter in Ithaca, New York

For the second generation, three new "partner" institutions were recruited to work closely with three of the original museums. Partner museums include:

- The Health Adventure in Asheville, North Carolina which partnered with Catawba;

²⁰ Ann Arbor Hands-On Museum in Ann Arbor, Michigan, was also a member of the first TEAMS collaborative.

- Rochester Museum and Science Center which partnered with the Sciencenter; and
- The Family Museum of Arts and Science in Bettendorf, Iowa which partnered with the Discovery Center Museum.

Each pair of “partner” museums, who were located within the same geographical region, worked together to create a single exhibition by sharing expertise and resources within their partnerships. Montshire Museum created an exhibition without a formal partner, and was also the administrative and financial coordinator of TEAMS.

Inverness Research Associates served as the evaluators for both TEAMS awards, working with the museums in a formative capacity as they designed the exhibitions, providing documentation of and feedback to the collaborative about their collective work, and conducting summative evaluations of the exhibitions as they traveled to their first venue.

Before we examine the extent to which the funding of exhibit collaboratives—and this particular collaborative—was successful, we want to examine why these museums decided to collaborate, and why they were funded.

THE RATIONALE

Several propositions underlie the TEAMS Collaborative’s “theory of action.”²¹ First, as we have pointed out, small museums often lack the capacity for developing good exhibits on their own, or hosting the larger traveling exhibitions. There are several reasons for this:

- 1) Small museums typically do not have the resources to employ large numbers of staff members or to bring in outside expertise. Consequently, there are few specialists on the staffs of small museums: everyone must do a little of everything.
- 2) Staff members in small shops may feel isolated and are not likely to have colleagues close by with whom they can exchange ideas or seek critiques.
- 3) Small museums have different needs than large museums. They often have smaller spaces and smaller operating budgets; they have neither the funds to rent nor the space to house many of the exhibitions in the field.

If several small museums can work together, then—it is theorized—they can share collective resources such as materials, time, consulting with experts on particular themes of interest (e.g., family learning, or accessibility), as well as time with evaluators. And by networking, each museum that builds an exhibit can use the others as peer reviewers, and collaborative meetings become a place to get feedback on their ideas and designs. In short, using their collective resources, they can build better exhibitions as a group than they could alone. Collaboratives help overcome isolation, providing vehicles for individual museum staff to meet with and learn from their peers in an ongoing way.

Additionally, if a group of small museums can come together to create traveling exhibitions designed specifically for small museums, then they will not only serve themselves, but also other similar institutions. Therefore, there is both a need and an opportunity to develop the exhibit-building capacity of small museums, and such a capacity-building effort can be tailored to the realities of small museums. A collaborative is not only seen as a good way to build better exhibits, but also as a good way to engage in a collective capacity-building endeavor.

THE RETURN ON INVESTMENT

It is with these propositions in mind that we examine the extent to which the NSF’s investment in the TEAMS collaborative was a successful one. How successful were these seven museums in producing high-quality exhibits, as well as enhancing the capacity at their institutions through the collaborative work? What were the mechanisms they used to do this, and what did they learn from implementing those mechanisms? What were the costs and benefits to collaborating as individual partners and as a group?

The TEAMS collaborative was ambitious in its efforts in this second round of funding and was successful along a number of fronts. In addition, several key lessons for the larger field emerged.

Exhibition Development and Capacity-building: Key Design Elements

The TEAMS Collaborative was funded to develop a set of traveling exhibitions that would meet the needs of small museums while at the same time developing the capacity of the staff working in the participating museums. Our evaluation shows that the NSF investment in TEAMS did, in fact, provide for both of these outcomes to occur. Four good-quality exhibitions and related education programs were produced that are well-suited to help meet the needs of small museums. The exhibitions are sized to fit small spaces,

²¹ The “theory of action” refers to the logic that underlies the connection between the NSF investment and the ultimate public benefits that derive from the investment. A bibliography of publications about the evaluation logic model is available at <http://www.uwex.edu/ces/pdande/evaluation/evallogicbiblio.html>

have compelling themes (the human body, force and motion, the science of sports, and hearing), and engage visitors through a variety of experiences. They help expand the repertoire of available exhibitions for small museums to rent.

Quality control amongst the group, along with outside evaluation assistance, helped to identify problems and eliminate most exhibit “failures.” The collaborative provided a greatly supportive structure that each museum followed. This structure included a development scheme, timetable, and process (including charrettes where members shared and critiqued exhibit and program ideas; and formative evaluation visits by Inverness Research Associates). Because all museums participated in this structured process, we saw improvements in the exhibits and programs at each stage of development. This did not mean that all exhibits were of uniform quality, but it did ensure a more thoughtful, solid and uniform exhibit development process. In this way, the collaborative structure and processes did add real value to the final products. There is little doubt that these exhibits were better than if they had been created by individual institutions working in isolation.

More importantly, perhaps, the collaborative enhanced the ability of these small museums to create good exhibitions and provided institutional growth and development opportunities otherwise unavailable to them. Mechanisms for learning, community and capacity-building included:

- annual meetings of the TEAMS members;
- broader attendance at Association of Science-Technology Centers annual conferences;
- special workshops and discussions around the theme of designing universally accessible exhibits;
- work with Inverness Research on evaluation and prototyping;
- travel grants to visit each other’s museums;
- the opportunity to write for the TEAMS monograph about particular areas of interest; and
- ongoing communication among the group.

The emphasis on community provided many different opportunities for staff to gain knowledge and communicate their ideas with one another. The community created in the collaborative also provided a shared set of expectations and commitment, and increased the connection to and investment in this project.

One of the key elements of the TEAMS project is the identification of a specific “theme” to focus on as they built their exhibitions. In the first TEAMS project, the shared focus was on family learning and, to some

extent, prototyping and formative evaluation. With the second project, the focus was on creating exhibits that were accessible to visitors with a range of disabilities. The third generation of TEAMS is focusing on the use of research to augment design. For each of these themes, outside experts have been brought in to help the collaborative members learn about and address the challenges inherent in each area of focus. Providing a shared challenge, the “themes,” it can be argued, contributed to better exhibits but also to greater capacity-building. For most of the museums’ staff, paying attention to the issues central to each theme changed the way they thought about not only this exhibition, but all of the work that they do at their respective museums. Thus, attention to the shared work allowed for significant institutional development.

Also, the addition of the “partner” museums allowed each museum to work closely with another museum in its region. This created many opportunities for shared learning on not only exhibition and education program development and evaluation, but also on museum operations and management.

The emphasis of the collaborative on formative evaluation created a role for Inverness Research that provided ongoing feedback and critique of collaborative members’ work. The facilitative role of Inverness Research also provided structure, opportunities, and benchmarks for the collective development process. The research aspect of the work of Inverness Research helped everyone see that their work involved not only the creation of exhibits but also the creation of knowledge that could help the field.

The Costs of Collaboration

In addition to the many benefits that we have discussed above, there are also inevitable costs to collaboration. There are always tensions and frictions in relationships that stem from institutional proprietary interests as well as different institutional cultures, philosophical stances and modes of operating.

Some of the “costs” to collaboration in the TEAMS project included the time and frustration, especially within the partnerships, involved in developing relationships, understanding one another’s cultures and ways of operating, and working in concert to develop the exhibitions and programs. Other challenges included a lack of clarity about roles and expectations, both within the partnerships and among the larger collaborative. There were limitations to some of the web-based communication the group experimented with. Additionally, differences in perspectives and philosophies created tensions: it was difficult to design and deliver exhibitions that fulfilled the different criteria of each museum in terms of marketing, inquiry, science content, and robustness.

As a result, it has taken TEAMS considerable time to develop trust between partners and establish effective modes of working together. There is an ongoing tension between institutional autonomy and collective agreements. The collaborative is always working to balance the two, so that the exhibits produced from TEAMS reflect “TEAMS values” and also represent the unique strengths of each of their institutions.

The TEAMS collaborative has evolved and will continue to evolve. There is an ongoing need to constantly refine how the members work together so that the benefits of collaboration continue to outweigh the costs. The TEAMS collaborative has discovered ways to build community, to share resources, to use the collaborative as a shared structure for building exhibits and developing programs, and to develop the individual and group capacity of each of its members.

SECTION 7

Bibliography

This annotated bibliography contains a short list of publications and websites useful to museum collaboratives. For readers interested in further research on collaboration, the bibliography by Nielsen provides an excellent starting point.

Austin, James. *The Collaborative Challenge: How Nonprofits and Businesses Succeed through Strategic Alliances.* San Francisco: Jossey-Bass, 2000, 224 pp.

In his book, James E. Austin provides a practical framework for understanding how traditional philanthropic relationships can be transformed into strategic alliances. He offers advice and lessons drawn from the experiences of numerous collaborations, including Timberland and City Year; Starbucks and CARE; and Hewlett-Packard and the National Science Resource Center. Covered are topics such as finding and connecting with high-potential partners; ensuring strategic fit with the partner's mission and values; generating greater value for each partner and society; and managing the partnering relationship effectively.

Bergquist, William H., July Betwee, and David Meuel. *Building Strategic Relationships: How to Extend Your Organization's Reach Through Partnerships, Alliances, and Joint Ventures.* San Francisco, CA: Jossey Bass, 1995, 272 pp.

Building Strategic Relationships shows how successful alliances are launched, developed, and concluded within the corporate world and between corporations and governments or nonprofits. Drawing from more than two hundred interviews and seventy-five case studies, the authors include detailed examples aimed to help partnering organizations achieve their goals. While focused primarily on for-profit corporations, the book includes many principles useful for non-profit collaboratives.

Coats, Victoria Crawford. *Seeking Synergy: Creating a Museum Collaborative that Works.* Portland, OR: Oregon Museum of Science and Industry, 1994, 48 pp.

Sometimes referred to as the "Redbook" of collaboration, this report examines the benefits and pitfalls of museum collaboration based on experiences of the Exhibit Research Collaborative. Chapters focus on organizing a collaborative, setting design standards, promoting staff development, marketing, fundraising, and helpful basic documents.

Dierking, Lynn D., John H. Falk, Dana G. Holland, Susan Fisher, Dennis Schatz, and Leila Wilke. *Collaboration: Critical Criteria for Success.* Washington, DC: Association of Science–Technology Centers, 1997, 69 pp.

Sometimes referred to as the "Greenbook" of collaboration, this report is designed to provide insights into the principles underlying successful collaborations. Based on a series of interviews and focus groups with museum professionals, the report touches on issues such as when to collaborate, what factors serve as keys or obstacles to success, and examples of successful collaborations.

Grassroots Science Museums Collaborative. <<http://www.grassroots-science.org>>

This website describes a successful museum collaborative in North Carolina that has the goals of improving public understanding of science and technology, enhancing school-based education, building institutional capacity, and fostering collaborative projects among its members. This group, which serves a model for statewide museum collaboration, developed an exhibit project related to math education with funding from the National Science Foundation.

Lencioni, Patrick. *The Five Dysfunctions of a Team.* San Francisco, CA: Jossey-Bass. 2002, 229 pp.

This classic bestseller from the for-profit business world presents a leadership fable that outlines five of the most common pitfalls associated with leading a team: lack of trust, fear of conflict, lack of commitment, avoidance of accountability, and inattention to results. Included are useful suggestions on the evaluation of teams.

Massachusetts Institute of Technology. *Museum as Catalyst for Interdisciplinary Collaboration.* Cambridge, MA: Museum Load Network, 2002, 63 pp.

This report summarizes the work of a group of 40 museum professionals who spent a year and a half exploring collaboration. A collection of six essays, this publication presents an interim report of what is essentially a work in progress, touching on issues related to what goes into a successful collaboration as well as managing and evaluating a collaborative. The focus is on museums that collect cultural objects.

Mattesich, Paul, Marta Murry-Close, and Barbara Monsey. *Collaboration: What Makes It Work* (2nd Edition). Amherst Wilder Foundation, 2001, 104 pp.

This practical guide to collaboration includes a description of 20 factors influencing successful collaborations related to environment, membership characteristics, process and structure, communication, purpose, and resources. The book includes practical suggestions for using the principles and an extensive bibliography.

Nielsen, Kirsten. *Collaboration Resource List.* Fieldstone Alliance, 2003. <http://www.fieldstonealliance.org/client/client/_pages/articles_tools/collaboration_bibliography.cfm>

This partially-annotated bibliography on collaboration contains over 200 publications on collaboration for those involved in collaboration as well as collaboration consultants. A list of sources for the publications listed is included.

Schein, Edgar H. *Organizational Culture and Leadership*, 3rd Edition. San Francisco, Jossey-Bass, 2004, 464 pp.

Schein shows how to transform the abstract concept of culture into a practical tool that managers and students can use to understand the dynamics of organizations and change. In particular, Schein describes the influence of culture—what it is, how it is created, how it evolves, and how it can be changed.

Traveling Exhibits At Museums of Science. <<http://www.montshire.org/teams>>

Website of the TEAMS Collaborative. Included are details related to exhibits, programs, evaluation (including summative evaluation reports), workshop notes, and other useful documents.

SECTION 8 APPENDICES

MATERIALS DEVELOPED BY THE TEAMS COLLABORATIVE

- A. Guidelines for Successful Collaboration
- B. Bylaws of the Collaborative
- C. Tour Contract and Schedule
- D. Sample Front-End Survey Form
- E. Characteristics of a Rich Exhibit
- F. Exhibit Design Guidelines
- G. Exhibit Design & Safety Checklist
- H. Elements of Educational Program Materials
- I. Marketing Materials
- J. Facilities Summary for TEAMS Museums
- K. Members of the TEAMS Collaborative

APPENDIX A

Guidelines for Successful Collaboration

During one of the initial TEAMS Collaborative meetings, each member of the group wrote down three items they personally considered important for successful collaboration. The results, tallied below, were discussed with the group at each meeting during the life of the collaborative.

1. Clear communication
2. Clear & shared expectations and vision
3. Constant sharing of ideas
4. High standards of quality / durability for exhibits
5. Mutual trust, respect, and equality among all museums

OTHER ISSUES

- Making the collaborative a high priority—even when other things pile up
- Commitment to others' success
- Getting information to those who need it (e.g. exhibit information to marketing staff)
- Having fun while working and learning together
- Having a person involved who has institutional memory of the collaborative
- Remaining open to new ideas at all stages of the project
- Willingness to take shared risks

APPENDIX B

TEAMS Collaborative Bylaws

ARTICLE 1 - NAME AND PURPOSE

Section 1. Name

The name by which the Collaborative shall be known is TEAMS (which shall hereinafter be referred to as the Collaborative).

Section 2. Purpose

The Collaborative is a nonprofit association of science museums. Its purpose shall be the encouragement of public interest in, and understanding of, science and technology through the collaborative production of traveling exhibitions and display of such exhibitions at member institutions, and through such other educational activities as may be appropriate and agreed to by the Board of Directors from time to time.

ARTICLE 2 - MEMBERSHIP AND DUES

Section 1. Membership

(a) Qualifications. Membership in the Collaborative shall be limited to science museums that are members of the Association of Science-Technology Centers. No organization may become a member unless it meets the criteria established in Section 501(c)(3) of the Internal Revenue Code of 1986, as amended from time to time, and an organization may remain a member only so long as it continues to meet such criteria.

(b) Term of Membership and Renewal.

Membership in the Collaborative shall be for a term of four years, and all privileges and responsibilities of membership shall be in effect for said term. A museum member shall be eligible for renewal of membership as many times as such renewal may be approved by three-fourths vote of the members of the Collaborative.

(c) New Members

(1) New members may join the Collaborative by three-fourths vote of the Board of Directors.

(2) Proposals for memberships in the Collaborative shall be submitted in writing to the chair of the Collaborative at least thirty days before any meeting at which election of new members may be considered.

Section 2. Dues

Members of the Collaborative shall pay dues annually on a calendar year basis to the Collaborative. The amount of said dues shall be determined at each annual meeting of the Board of Directors of the Collaborative. Payment shall be made in the first quarter of each calendar year and shall be overdue if not paid by March 31. Failure to pay such dues promptly after written notice by the Collaborative that payment is overdue may result in termination of membership.

Section 3. Procedure for Termination

- (a) Removal by Vote of Directors. Any member of the Collaborative may be removed from membership for any reason by a three-fourths vote of the Board of Directors at a meeting of the Board of Directors, provided such an action is set forth clearly in a written notice mailed to all member directors not less than fourteen days prior to the date of such meeting. Once removed, a member must pay all dues owed through the date of such removal, but shall have no obligation to pay dues throughout the remainder of its unexpired term. Any member removed in such manner shall remain eligible for receipt and display of all exhibitions produced and completed during those years in which its membership dues were paid in full. It shall pay its proportionate costs associated with the maintenance and transportation of such exhibits.
- (b) Resignation. Any member of the Collaborative may resign by filing a letter of resignation in writing with the Secretary. Any member resigning prior to the completion of the normal four-year term of membership shall be responsible for 50 percent of said member's annual dues for the year in which resignation occurs. Resignation shall not eliminate any obligations members may have with regard to participation in projects supported by grants or contracts, including but not limited to matching funds requirements of the National Science Foundation for grant funds received.

Section 4. Benefits and Responsibilities of Membership

- (a) Planning, Design, and Production of Exhibits. All members assume responsibility for the planning, design, and production of traveling exhibitions as defined from time to time by vote of the Board of Directors. Any member wishing not to be subject to an exhibit requirement so voted by the Board of Directors shall notify the Secretary and resign within 60 days of the vote by the Board of Directors. Any production

costs in excess of the budget agreed on by the Board of Directors shall be the responsibility of the member producing such an exhibition. No excess costs shall be borne by the Collaborative without prior approval by three-fourths of the Board of Directors. The Collaborative or the producing institution may raise additional funds for an exhibition to supplement the exhibit budget, when appropriate.

- (c) Adherence to General Guidelines. All exhibitions produced by member institutions with funds provided by the Collaborative shall be constructed in accordance with the General Guidelines of the Collaborative for the design and construction of traveling exhibitions.
- (d) Fundraising. Members responsible for the production of an exhibition for the Collaborative shall also be responsible for coordinating with the Chair all fund-raising for such specific exhibit projects that may be conducted in the name of the Collaborative and for reporting any such fund-raising plans and results to the members of the Collaborative.
- (e) Ownership of Exhibitions. An exhibition produced for the Collaborative by any member or team of members shall become the property of that member or that team of members at the conclusion of the planned tour. After completing any touring requirements of the Collaborative, any member may display or dispose of any or all portions of its exhibition as may be appropriate, except that all items borrowed for the exhibition must be returned to the original owners.
- (f) Display of Exhibitions.
 - (1) Each member shall have the right to display all exhibitions produced in the name of the Collaborative during those years in which the member paid membership fees in full, in accordance with a schedule of travel agreed to by the members of the Collaborative.
 - (2) All members displaying an exhibition produced for the Collaborative will be responsible for installation, promotion, and pro-rata traveling costs, unless the members of the Collaborative agree to pay all or part of such costs from the funds of the Collaborative.

ARTICLE 3 - FISCAL YEAR, MEETINGS OF THE COLLABORATIVE, AND REPORTS

Section 1. Fiscal Year

The fiscal year of the Collaborative shall commence on the first day of the grant period and run for one calendar year.

Section 2. Meetings of the Collaborative

An annual meeting of the Collaborative shall be held in the same city and no more than three days before the annual meeting of the Association of Science-Technology Centers is held. All member museum staff involved with Collaborative projects are invited to participate. Written notification of specific time and location shall be given to all member museums at least fourteen days in advance, unless such notification is waived by three-fourths of all members. At Collaborative meetings, participants will discuss exhibit, program, marketing, and other issues that may properly be brought before the Collaborative membership. Any matters not resolved by consensus shall be referred to the Board of Directors.

Section 3. Meetings of the Board of Directors

A meeting of the Board of Directors shall be held together with the annual fall meeting of the Collaborative to decide financial issues and any other issues that the Board of Directors deems should not properly be addressed by the general membership of the Collaborative. At this meeting, officers of the Board of Directors shall be elected, and such other business as may properly be brought before the Board of Directors shall be transacted.

Section 4. Minutes

The proceedings of all meetings of the Collaborative and of the Board of Directors shall be kept by the Secretary, or in the absence of the Secretary, by a secretary pro tem appointed by the Chair. Copies of the records of such proceedings shall be distributed to each member of the Collaborative within thirty days after the date of each such meeting.

Section 5. Financial Report

A financial report of the Collaborative shall be distributed annually to all members of the Collaborative. Reports indicating receipts, disbursements, and balances of the accounts of the Collaborative shall be distributed to all members quarterly.

ARTICLE 4. BOARD OF DIRECTORS

Section 1. Composition

The Board of Directors shall consist of one Director chosen by each member institution. In general, Collaborative Directors shall be the CEOs of the member museums. *Voting members* of the Board shall be Collaborative Directors from charter institutions (the Catawba Science Center, Discovery Center Museum, Montshire Museum of Science, and Sciencenter Discovery Museum). *Non-voting members* of the Board shall be Collaborative Directors from partner institutions (The Health Adventure, the Family Museum of Arts and Science, and the

Rochester Museum and Science Center). Each Director shall hold office until a successor has been chosen by the member institution that elected him/her, or until his/her death, resignation, or removal.

Section 2. Quorum and Voting

A quorum shall consist of at least three voting members of the Board of Directors. Each voting Director shall be entitled to one vote on all matters that come before the Board of Directors.

Section 3. Powers

The Directors may exercise all the powers of the Collaborative except such as required by law or by the Bylaws of the organization to be otherwise exercised. The Directors shall have the general direction, control, and management of the activities of the Collaborative. Except as otherwise provided by the Bylaws, the Directors shall have the power to purchase, lease, and sell such property and to make such agreements as they deem advantageous. They may determine the duties, in addition to those prescribed by the Bylaws, of all officers, agents, and employees of the Collaborative. In the event of a vacancy in the Board of Directors, the remaining Directors, except as otherwise provided by law, may exercise the power of the full Board until the vacancy is filled.

Section 4. Vacancies

A vacancy in the Board of Directors, however occurring, unless and until filled by the member institution who is not represented on the Board of Directors as a result of such a vacancy, may be filled by a vote of the majority of the voting Directors present at any meeting of Directors at which a quorum is present or by appointment by all of the voting Directors if less than a quorum is present.

Section 5. Removal

In the event of the termination pursuant to Article 2, Section 3, the Director representing the affected member shall be deemed to have resigned as of the date of the termination.

Section 6. Meetings and Action by Consent

- (a) Place. Meetings of the Board of Directors, other than the annual meeting, shall be held at such times and places as designated by the Chair of the Collaborative. A telephone conference or conference by other electronic media may constitute a meeting of the Board of Directors. Members who may not be able to attend a meeting in person may, at their discretion, elect to attend such meeting by telephone or other electronic medium.
- (b) Notice. Notice of any additional meeting or meetings of the Board of Directors shall be sent

to each Director by U.S. mail or electronic mail at least thirty days before the date set for the meeting. A Director may waive his or her right to notice of such meeting.

- (c) Quorum. A quorum for the transaction of business at any meeting of the Board of Directors shall be three-fourths of the voting members of the Board of Directors present in person, represented by proxy, or in communication with the meeting by telephone or other electronic medium. If, however, no such quorum be present or represented at any meeting of the Board of Directors, the Directors present in person or represented by proxy shall have power to adjourn the meeting from time to time, without notice other than announcement at the meeting, until a quorum shall be present or represented. At such an adjourned meeting at which a quorum shall be present or represented, any business may be transacted which might have been transacted at the meeting as originally notified.
- (d) Requisite Vote. A majority vote of the members shall decide any question brought before a meeting, unless the question is one upon which the Bylaws require a different vote.
- (e) Consent. Any action required or permitted to be taken at any meeting of the Board of Directors may be taken without a meeting if all of the Directors consent to the action in writing and the written consents are filed with the records of the Directors' meetings. Each such consent shall be treated for such purposes as a vote at a meeting.

Section 7. Committees

The Directors may elect from their number an Executive Committee or other committees and may by like vote delegate to committees some or all of their powers to the extent permitted by law. The Board of Directors shall have the power at any time to fill vacancies in any such committee, to change its membership, or to discharge the committee.

Section 8. Compensation

A Director shall receive no compensation for performance of his or her duties as Director, but may be entitled to be reimbursed by the Collaborative for reasonable and necessary out-of-pocket expenses incurred in attending meetings of the Board of Directors or while rendering necessary services to or on behalf of the Collaborative.

Section 9. Indemnification and Limitations on Liability

The Collaborative shall indemnify to the full extent authorized by law any person made or threatened

to be made a party to any action, suit, or proceeding, whether criminal, civil, administrative, or investigative, by reason of the fact that he or she was a Director or officer of the Collaborative.

ARTICLE 5 - OFFICERS

Section 1. Officers

The officers of the Collaborative shall be a Chair, Treasurer, Secretary/Vice Chair, and such additional officers as the Collaborative may from time to time deem necessary. The officers shall be elected for a two-year term by the Board of Directors at the Annual Meeting. Officers should be chosen from the members of the Board of Directors. Officers of the Collaborative may appoint such agents to assist in carrying out the duties of the offices as may be appropriate.

Section 2. Chair

The Chair shall be the chief executive officer and shall preside at meetings of the Board of Directors; sign such papers as may be required by this office; make such reports and recommendations to the Board of Directors at annual meetings or special meetings concerning the work and affairs of the Collaborative, which, in his or her judgment, are desirable for their information and guidance; require such reports from the Secretary, Treasurer, or member of the Collaborative engaged in the production of an exhibition for the Collaborative as are necessary; perform other duties incident to that office; and perform such other duties as are consistent with the goals and purposes of the Collaborative.

Section 3. Treasurer

The Treasurer shall receive and be custodian of all funds of the Collaborative, shall keep a full account of funds to be paid out and make such reports to the Board of Directors as they may require; prepare annually a comprehensive financial statement; and perform such other duties as are consistent with the goals and purposes of the Collaborative.

Section 4. Secretary

The Secretary shall issue all notices of meetings of the Board of Directors; keep complete records of the meetings; be custodian of all records except for financial records; perform other duties incident to that office; and perform such other duties as are consistent with the goals and purposes of the Collaborative.

ARTICLE 6 - GENERAL POWERS

Section 1. Checks

The Treasurer shall select a depository bank and receive and collect all checks and other instruments

payable to the Collaborative. The Board shall establish policies governing authority for signing checks and other financial instruments on behalf of the Collaborative.

Section 2. Other Powers

The Collaborative may purchase; borrow; take by lease, license, or easement; or otherwise acquire any kind of real or personal property, in any amount or proportion, and hold it for any length of time. It may cause title to be recorded or registered in the name of the members of the association or of a nominee. The Collaborative may sell, mortgage, grant a security interest in, lease (for any length of time), or otherwise deal with real or personal property on such terms as it deems proper; it may pay any debt or claim on the basis of such evidence as it deems sufficient and may compromise any debt or claim on terms as it deems proper; it may cause to be executed, acknowledged, and delivered a deed, mortgage, security agreement, lease, or any other instrument or document in such manner, in such form, and for such purpose as it deems proper. All contracts, legal documents, etc., as described above and as approved by an appropriate vote of the Directors shall be signed by both the Chair and the Treasurer or Secretary, or such other person or persons as the Board of Directors may from time to time designate.

ARTICLE 7 - GENERAL GUIDELINES OF THE COLLABORATIVE

Section 1. General Guidelines of the Collaborative

The Collaborative shall establish general guidelines that shall apply to the construction of exhibitions, payment of dues, application for funds for exhibit production, levies or proposals, fund-raising procedures, tour schedules, publicity and credits, and other aspects of the work of the Collaborative that may appropriately be included in such guidelines.

Section 2. Review and Amendment

The general Guidelines shall be reviewed by the Board of Directors whenever appropriate and may be amended by a three-fourths vote of the Board of Directors of the Collaborative.

ARTICLE 8 - AMENDMENTS

These bylaws may be amended only at any meeting of the Collaborative by a vote of at least three-fourths of the Board of Directors provided that notice of the meeting is mailed no less than fourteen days prior to the date of the meeting and that the notice clearly sets forth the contemplated action.

ARTICLE 9 - DISSOLUTION OF THE COLLABORATIVE

The Collaborative may be dissolved by a three-fourths vote of the Board of Directors at the time of dissolution. In the event of such dissolution, any contributions to the Collaborative by any individual or organization not a member of the Collaborative, that may be required by the terms of its contribution to be returned to the non-member contributor in the event of such a dissolution, must be so returned. Any assets of the Collaborative remaining after satisfaction of its outstanding liabilities shall be distributed in equal shares to the member institutions at that time.

ARTICLE 10 - COLLABORATIVE ACTIVITIES

The activities of the Collaborative will be wholly consistent with the tax-exempt status of its member organizations and with the laws of the states in which its member organizations are located.

ARTICLE 11 - LIABILITY

Members producing or displaying an exhibition of the Collaborative shall hold harmless all other members of the Collaborative for any liabilities that may be incurred in connection with the exhibition. The Collaborative may require certificates of insurance from its member institutions to be kept on file by the Secretary of the Collaborative.

ARTICLE 12 - SPECIAL GRANTS

The Collaborative may apply for special grants from the National Science Foundation and other organizations for the carrying on of exhibit activities. Details of each such grant request shall be approved at a duly called meeting of the Board of Directors of the Collaborative. Once such a grant proposal is made and the grant is awarded, the members of the Collaborative involved with the grant proposal will enter into a separate agreement between themselves as to the administration of the grant. In this connection, the members of the Collaborative will conduct a meeting at which minutes will be kept. The terms of the agreement will be determined by all members involved with the grant proposal.

APPENDIX C

Exhibition Tour Agreement

Section I—Definitions

Originating Museum Museum that developed and built the exhibition. In the event of two museums having worked together on the same exhibition, the museum that legally owns the particular copy of the exhibition is defined as the “originating museum” as follows:

Hear Here: Montshire Museum of Science: owns Copies 1 & 2

Cool Moves: Sciencenter: owns Copies 1 & 2

Body Carnival: Catawba Science Center: owns Copies 1 & 2

The Health Adventure: owns Copy 3

Team Up: Discovery Center Museum: owns Copy 1 & 2

Receiving Museum Museum that is receiving (hosting) and displaying an exhibition.

Sending Museum Museum that is sending (shipping) the exhibition from its current venue. At the end of each exhibition’s venue, the “receiving museum” becomes the “sending museum” for the next venue.

Section II—Parties Participating in This Agreement

Name of Exhibition:

Originating Museum:

Sending Museum:

Receiving Museum:

Section III—Dates

Pick Up Dates: Listed on the attached TEAMS 2 Tour Schedule

Approximate Delivery Date:

Opening Date: As determined by receiving museum

Closing Date: Listed on the attached TEAMS 2 Tour Schedule

Pick Up Date: Listed on the attached TEAMS 2 Tour Schedule

Section IV—Division of Responsibilities

The **Receiving Museum** is responsible for providing:

- 1) Incoming shipping by Mayflower. In the event that a museum has obtained donated shipping services, this carrier must first be approved by the museum owning the exhibition being shipped. Pick-up dates are listed in the attached tour schedule but may be modified by mutual agreement of the Receiving Museum and the Sending Museum. Coordination with the shipping company is the responsibility of

the Receiving Museum, with assistance from the Sending Museum. Exhibitions must be shipped using appropriate crates and custom blanket wrapping provided by the Originating museum, supplemented, as necessary, by blankets provided by the shipper.

- 2) Sending a copy of the completed “Inbound” condition report to the Originating Museum by e-mail or FAX within 48 hours of receipt of the exhibition and an “Outbound” condition report by e-mail or FAX within 48 hours of takedown of the exhibition in preparation for shipping to the next venue. Hard copies of these reports will be kept in the Technical Manual for the exhibition (see below).
- 3) Liability insurance of at least \$1 million to cover the exhibition at all times while it is on the site of the receiving museum. The Receiving Museum will provide a certificate of insurance showing proof of liability insurance to Originating Museum. The receiving museum will NOT list the Originating Museum as an “additional insured.”
- 4) Indoor space to receive the exhibition when it is delivered and to have it repacked and ready to ship by the shipping date in the attached schedule.
- 5) A safe and secure environment for the exhibition, including appropriate security while the exhibition is at the Receiving Museum.
- 6) Promotion of the exhibition, including giving credit to the Originating Museum and the National Science Foundation in all print and electronic media releases. In addition, the Receiving Museum will exhibit the exhibition’s entry kiosk which may include credit to other sponsors.
- 7) Normal start up or ongoing maintenance costs of a “minor” nature. Examples might include replacement of light bulbs, living animals, general cleaning and janitorial care of the exhibition.
- 8) Replacement or repair of exhibit components damaged due to visitor abuse beyond normal wear and tear, negligence of the Receiving Museum, or by a failure to follow set up or maintenance instructions specified in the Technical Manual.
- 9) Unloading of the exhibition at its site using qualified personnel in accordance with procedures specified in the exhibition’s Technical Manual, and re-packing and loading of the exhibition in preparation for its shipment to the next venue using qualified personnel in accordance with procedures specified in the exhibition’s Technical Manual.
- 10) Safe storage for crates and unused modules.

The **Originating Museum** is responsible for:

- 1) Providing the exhibition in good working order at the start of the tour.
- 2) Liability insurance of at least \$1 million covering the exhibition at all times while it is off the site of the Originating Museum.
- 3) "Direct causes of physical damage" (also known formerly as "all risk") property insurance for the replacement value of the exhibition (as determined by the Originating Museum) throughout the entire TEAMS 2 tour listed in the attached schedule. This includes while the exhibition is in transit from the Sending Museum to the Receiving Museum, while the exhibition is at the Receiving Museums, and during loading and unloading at all TEAMS 2 venues.
- 4) Crates and storage materials throughout the entire TEAMS 2 tour listed in the attached schedule.
- 5) Furnishing a Technical Manual which details proper loading/unloading and packing/re-packing procedures, setup, and maintenance procedures to be utilized.
- 6) Providing the agreed-upon PR and education materials to support the exhibition.
- 7) Furnishing the agreed-upon exhibition condition report form, and components check list in an online format.
- 8) Using standard exhibition components which are readily obtained from local suppliers and for sending/including replacement parts for key "non-standard" exhibition components.
- 9) Replacement/repair of exhibit components that become inoperable for causes other than visitor abuse and/or the gross negligence of the Receiving Museum as soon as feasible. In the event of major breakdown, the Originating Museum has the option of sending staff to the Receiving Museum to make repairs or asking for the broken component(s) to be shipped back to the Originating Museum at its expense. Since prompt repair is important, it is agreed that the target will be to ship such components overnight and to have the repairs completed or replacement parts sent within a maximum of 5 working days.
- 10) Outgoing (return) shipping from the final exhibition venue back to the Originating Museum.

Section V – Other Issues

- 1) In the event of circumstances beyond the control of the Originating Museum or any other TEAMS 2 museum that would prevent the exhibition from arriving on time, the Originating Museum and

TEAMS 2 members are not responsible for any charges and damages incurred by the Receiving Museum for preparation and promotion of the exhibition.

- 2) Indemnification: The Receiving Museum agrees to indemnify and hold harmless the Originating Museum and any other TEAMS 2 museum from and against all damages, claims, suits, or other legal proceedings arising from or attributed to negligent or improper operations, display, or other actions by the Receiving Museum in relation to this agreement. The Originating Museum agrees to indemnify and hold harmless the Receiving Museum and any TEAMS 2 museum from and against all damages, claims, suits or other legal proceedings arising from or attributed to negligent or otherwise improper design, construction or operation by the Originating Museum in relation to this agreement.
- 3) The Receiving Museum shall not have the right to modify or alter the exhibition in any manner.
- 4) Arbitration: In the event that there is a dispute regarding the responsibility for replacement of an exhibit component, the appropriateness of a specific shipping company, venue dates, or the like, the directors of the two institutions involved will negotiate a settlement. In the event of an impasse, a committee composed of the Directors of the TEAMS 2 institutions will decide the issue based on majority vote.

Accepted by:

Name, Title	Date
Originating Museum	

Name, Title	Date
Receiving Museum	

TEAMS 2 TOUR SCHEDULE

Assumptions:

1. Sixteen week venues, more or less.
2. Two weeks allowed between venues. Museums can open later or earlier if they wish; listed date given is a guideline.
3. Exhibits close on a Sunday (firm dates given), ship on Wednesday of the following week (except for 6/25/03).
4. Full and short form titles of exhibitions:

Hear Here: "Sound"
Cool Moves: "Motion"
Body Carnival: "Body"
Team Up: "Sports"

Exhibit Tour Schedule:

Begin:	1/18/03	7/9/03	11/12/03
End:	6/22/03	10/26/03	2/29/04
Ship:	6/25/03	10/29/03	3/10/04

CSC	Body 1	Sound 2	Motion 2
THA	Body 3	Motion 2	Sports 1
FM	Sports 2	Sound 1	Motion 1
SC	Motion 1	Body 1	Sound 2
RMSC	Motion 2	Sports 2	Sound 1
MMS	Sound 1	Sports 1	Body 2

Exhibit schedule continued:

Begin:	3/17/04	7-8/04
End:	7/4/04	Refresh
Ship:	7/7/04	

CSC	Sports 1	Body 1 & 2
THA	Sound 1	
FM	Body 1	
SC	Sports 2	Motion 1 & 2
RMSC	Body 2	
MMS	Motion 2	Sound 1 & 2

Legend:

CSC Catawba Science Center, 243 3rd Avenue, NE, Hickory, NC 28601
THA The Health Adventure, 2 South Pack Square, Asheville 28802
DC Discovery Center Museum, Rockford, 711 N. Main St., Rockford, Illinois, 61103
FM Family Museum of Arts & Science, 2900 Learning Campus Dr., Bettendorf, Iowa, 52722
SC Sciencenter, 601 First St., Ithaca, NY 14850
RMSC Rochester Museum & Science Center, 657 East Avenue, Rochester, NY, 14607
MMS Montshire Museum of Science, 1 Montshire Rd. Norwich, Vt. 05055

APPENDIX D

Front End Survey Form

Date _____

Location: Sciencenter Mall Commons Other _____

M or F Estimated age: (can ask children) _____

Ethnicity: W AA Hisp Asian Other _____

Feel free to experiment a bit and find out what wording draws people out the best. It is generally good to learn the questions and then ask them naturally (DON'T read them).

Lead-in: "We are thinking of building some exhibits about moving things for the Sciencenter, and we would appreciate some help from you as we plan what to build."

1. What first comes to mind when you think about things that move? Anything else?
2. What are some different ways that things can move? What ways are most interesting to you?
3. If we hired you to build a set of exhibits on motion, what would you include?
4. Do you think there is any art involved in the way things move? Why or why not?
5. Would you enjoy going to a museum to play with hands-on exhibits about motion? Why or why not?
6. What kind of title would attract you to come see an exhibition on motion?

APPENDIX E

Characteristics of a Rich Exhibit

During the planning for the TEAMS 3 project, the collaborative met for a weekend retreat to envision the types of exhibitions we would create. During this retreat, Mark St. John invited the group to brainstorm a list of what would characterize a “rich” exhibition (i.e., one that would be successful from as many different viewpoints as possible).

The list that follows is a compilation of the characteristics that the group assembled; while neither complete nor definitive, it helped the group focus on those attributes that the group felt all TEAMS exhibitions should try to incorporate.

Rich exhibition topics

- Have math or science at the core
- Have a well-crafted story-line and coherency
- Provide a diversity of experiences
- Have strong market appeal
- Make a contribution to visitors’ lives and allow visitors to connect their own knowledge with everyday experience
- Encourage open-ended exploration
- Do not require excessive technology, in general
- Are timeless

Rich exhibits

- Portray science accurately
- Are robust and work almost all of the time
- Are aesthetically pleasing, fun, delightful, have good lighting and color, and may offer sound or other multi-sensory aspects
- Have holding power and opportunities to engage people of different ages
- Allow for open-ended experiences
- Promote curiosity and lead visitors to say, “I want to know something more about this”
- Promote physical, intellectual and emotional interaction
- Promote visitor dialog and inspire them to share their experience with others
- Have multiple layers of complexity that visitors can choose among
- Are universally accessible, make visitors comfortable, and provide space for others to take part in or watch
- Take a familiar phenomenon and deepen a visitor’s relationship to or understanding of it, inspiring visitors to look at it in a new way

- Are unique; perhaps reflecting the local community; not mass-produced
- Are easy to navigate, with clear, well-written labels and graphics that complement the physical phenomenon
- Encourage the making of conjectures and provide opportunities to theorize

At-risk exhibits

- Have no “soul” or are based on inherently uninteresting ideas
- Are worn-out, broken, or not cared for
- Are difficult to navigate and lead visitors to say “I don’t get it” or “I can’t figure out what to do.”
- Have too many words and lead visitors to feel “lectured at” or spoken “down-to”
- Lead visitors to feel as if they have the wrong amount of knowledge, because designers have presumed they are smarter or more naive than they really are
- Assume that all the knowledge resides with the designer or museum and provide no opportunity to visitors to learn for themselves
- Are 100% linear or cause the same thing to happen every time
- Attempt to use interactivity when it is the wrong medium
- Contain distracting components
- Are unsafe
- Discourage interaction
- Cause conflicts between goals and activities
- Do not stand alone well as a single exhibit within an exhibition

APPENDIX F

TEAMS Exhibit Design Guidelines (1996)

INTRODUCTION

The overarching principle for all exhibit development should be common sense. As each exhibit differs from every other, and each museum's design sensibilities differ, overall design should meet basic principles of functionality, educational value, accessibility, and safety while allowing maximum flexibility for museums to try new approaches.

EDUCATIONAL ASPECTS

1. Relatedness to everyday life. The more an exhibit is related to everyday life, the more successful it is apt to be. If an exhibit reminds the visitor of something that he or she has experienced or observed, it has a better chance of arousing the visitor's curiosity and encouraging experimentation. Opportunities to make exhibits related to everyday life should not be missed.
2. Capacity to promote group interaction. Many visitors learn in museums through social interactions that occur during their visits. Visitors may spend time teaching each other through conversation (e.g., parent to child) or by interacting with others as they proceed through the exhibit-related tasks. Exhibit designers and builders should be sensitive to ways to encourage such social interaction. However, at the same time, each exhibit should provide some activity to satisfy a visitor who is alone.
3. Range of appropriate ages. We consider an exhibit to be more successful the greater the age range that it can interest. If an exhibit can be made to appeal to a wider range of ages by a minor adaptation, then we want to encourage the designer to include that adaptation. Breadth of age is not a requirement, but rather a consideration.
4. Science content. Each exhibit should have science content—should be based on scientific principles that are valuable and important for a person to experience and understand. Each exhibit should be able to lead visitors to discover principles and should provide opportunities for guides and teachers to illustrate principles. Success in conveying these principles to visitors is treated separately.
5. Open-endedness. Each exhibit should encourage experimentation by allowing visitors to try new configurations, new combinations, etc. At the same time, each exhibit should guarantee success. In other words, each exhibit should have something interesting to offer at the first encounter but

should lead the visitor to try experiments that are less defined, i.e., open-ended. Such open-endedness can lead a person to return to an exhibit many times, finding something new each time.

6. Interactivity. In general, exhibits should be designed to: 1) allow visitors to vary their actions or vary something about an exhibit to make something happen; 2) enable visitors to see clear and immediate effects of their actions, 3) produce some interesting or rewarding result, which may be different for different visitors.
7. Communication of science content. The process or principles that an exhibit demonstrates should be clearly conveyed by observations and experience, with adequate labeling to explain and guide further inquiry.
8. Process of science. Science is an activity that should help visitors become more conscious of how they learn and think about the world around them. An important part of the process of science is learning to evaluate information and ideas about the world that are presented to us.

GENERAL CONSIDERATIONS

Standardize locks, keys, monitors, push buttons, bearings, amplifiers, and power supplies. Stick to easily obtainable components so others can get replacements when failures occur.

FINISHES

Horizontal surfaces should have a durable covering where subject to contact or wear. Most laminates or carpeting are acceptable. Nevamar APP forms a durable surface. Avoid edges where the carpeting can fray (counter edges, etc.) Varnished birch plywood is not sturdy enough for horizontal surfaces.

On tabletops, laminates can be banded with a solid wood edge. Do not use iron-on edge banding. If T-molding is used, corners must have a 2-in minimum radius; do not miter T-molding. If leaving a laminated Baltic birch plywood edge exposed, round top and bottom edges with a router.

For vertical surfaces, such as cabinet bases and panels, laminate is a good choice, though chipping of exposed corners is problematic. Route a 1/8-in radius into wood edges. Where vertical laminate stops above a toe space, be careful to route a radius into the corner to prevent chipping. Carpeting is also acceptable for vertical surfaces.

In some instances, paint may be acceptable for vertical surfaces because it is comparatively cheap and easily repairable. Use a good-quality paint, such as Silathane, a Bruning product.

STRUCTURE

Honeycomb construction can be used to keep weight down (e.g., two layers of laminate or thin ply glued to an interior structure of honeycomb cardboard). GatorBoard is a substitute for the same effect. These constructions yield very strong, lightweight, though expensive panels. For small sections, plywood is fine. Birch is more or less a standard, because it is usually fairly flat, has a clean surface, and accepts paint or laminate.

MDF (Medium Density Fiberboard) is used in cabinet construction, but is heavy and fussy to put hardware into. MDO (Medium Density Overlay) plywood has two paper faces (make sure it has paper on both sides) works well and stays flat.

Hollow core doors, if they match what you need for size, can often be found surplus or damaged for as little as \$10. If you cut them down, you need to rebuild the interior structure. They are light and good for graphic panels.

Metal frames make for strong structures, but watch the weight.

Wood trim with polyurethane is acceptable. Stain it first, if desired. Wood glue works well for affixing wood trim

HARDWARE

Some sources for hardware include:

- Clem clips for panels (McMasterCarr)
- Coffin locks, which are sturdier (Southco, in Thomas register, also from McMasterCarr)
- Machine screws and T-nuts (or wing nuts for thru bolts)
- Loose-pin hinges, which can be used to attach parts (one section of hinge on one side, the other half on the part to be attached)
- Brass inserts—do not use because threads strip easily.

LABELS

All labels must be protected under Plexiglas or Lexan.

If the label can be laminated to the underside of the Plexiglas, so much the better (this can either be done commercially or using clear double-stick tape). If the label is not laminated to the back of a clear surface, it must be pocket-laminated for moisture-proofing.

Labels can be silk-screened directly onto laminate or onto a separate sign panel. You can also screen onto the back of Plexiglas, so that you are looking through the plastic at the screening. Several colors

can be done; track of what order they need to be screened.

Vinyl letters can be cut for bigger signs and graphics, but they won't work for small letters because there is a minimum size of about 1/2". You can mount vinyl letters in reverse onto the back side of Plexiglas or no-glare Lexan.

In general, labels on an exhibit need to be very well protected. Hanging signs that can't be handled can be less bulletproofed.

Sintra is a convenient material for signs and panels. It can be painted or silk-screened.

Try to keep to 30-pt type size for labels; 24-30 is acceptable with larger titles; smaller if past main point. Make the text large and short (60 words is a good working maximum). Avoid multiple fonts (title can be in a different font). Keep it simple.

ELECTRICAL COMPONENTS

Museums must be able to power exhibits from either the ceiling or the floor.

All wiring should be done competently and carefully. Consult with an electrician if you need to. Anything near water must be protected with a GFI (ground fault interrupt) circuit breaker.

Use sturdy three-wire round electrical cord with #16 wire or heavier—no zip-cord.

Everything must be grounded—no exceptions!

All electrical units should have an inaccessible (except to knowledgeable staff) power switch. We can't assume that the power in the gallery will be controlled from a switch, although that's how it usually works. A switch behind a keyed door, a keyed switch, a hole with a push-on--push-off switch behind it (you operate it with a pencil)...any of these will work. If possible, include an inconspicuous LED to indicate that the power is on.

Power cords should be removable, preferably without special connectors.

Switches (push button, etc.) must be sturdy. Include spares. Happ Controls makes switches for commercial video arcade games that are standard for exhibits. Use push-on connectors so that the switches are replaceable, but solder the wires to the crimp connectors. IMPORTANT: squeeze the spade crimp-on connectors with pliers to ensure that they will stay tight on the spade lugs of switches and other components.

Screw-terminal strips are acceptable, also. Make sure the wiring meets code, and make sure that someone opening up the cabinet knows where dangerous voltages are present if they are exposed (try to avoid exposed wiring with more than 24 volts).

Glue the schematic diagram to the inside of cabinet.

Use heat shrink tubing to tidy up and protect connections.

Use exhaust fans to remove heat. Cover vents with filters.

SPARE PARTS

Always stock a spare computer (minimum one per exhibition), motor, synthesizer, and any other large component. If a computer breaks, re-configure the spare, ship it to the host museum, and get the broken one back for repair. It is not necessary to have a spare fan or other parts if readily available from McMaster-Carr.

Include with the exhibition spare bulbs, push buttons, and any items people might remove, such as mallets, erasers, consumables.

Include spares if parts are difficult to get or will take a long time to replace.

SHIPPING

Most units will be blanket-wrapped. Make crates for delicate signs, etc.

TEAMS museums do not in general have forklifts. Therefore, keep an eye on maximum sizes and weights of pieces, since we need to load them through doors. Two people must be able to move any single unit.

Use good casters for heavy pieces. Casters that lock both the wheel and the rotation are expensive but well worth it. Bubble-wrap Plexiglas before blanket wrapping. Tie down equipment within components, such as VCRs, or put in original boxes.

Label ALL shipping cardboard boxes and wooden crates.

APPENDIX G

Exhibit Safety & Design Checklist

(Portions adapted from the Exploratorium Cookbook)

OVERALL EXHIBIT DESIGN

- Visual design of exhibit guides visitors to its use automatically.
- Exhibit can be easily manipulated, is visually pleasing, open-ended, applicable to experience in daily life.
- Power switches operated by seat or pedal are clearly marked.
- Adequate space and mounting surfaces are provided for explanatory graphics.
- Exhibit components and graphics are adequately lit, using backlit graphics for dark display areas.
- Both children and adults can use the exhibit easily.
- Exhibit format encourages interaction among several visitors, but there is always something that a single person can do.
- Exhibit is consistent in terms of operation, as far as possible: e.g. power buttons always in same corner; for computers, button formats consistent.
- Visitors have as much freedom to experiment as possible. Avoid "push same button, get same result" design. Choose exhibits which are rich enough to allow new experiences with multiple visits.
- Mechanical parts are exposed to view, if possible: e.g. innards of track balls, etc.
- Special guidelines for exhibits with computers are followed.
- Exhibit is accessible for people with wheelchairs or walking aids..
- Text lettering is large enough for people with low vision, at least 24 pt; 30-pt preferable.
- Speakers are tilted towards the visitor to localize sound from the exhibit or a special sound-focusing speaker unit is used.
- If exhibit is alterable by viewer, it resets itself for the next visitor.
- Exhibit is carefully located and oriented on the floor.
- Power and other utilities are available at the location of the exhibit.

- Exhibit is operable with a closed fist if at all possible.
- Where possible, explanatory information is offered (e.g. in dispensers on the wall, not in labels themselves).
- Lighting is considered in design, for aesthetic as well as physical purposes.

MECHANICAL DESIGN

- Exhibit will not tip over when lifted to a 25-degree slope in any direction. It has a stable base and a low center of gravity, and does not drift around on the floor.
- Exhibit fits into an elevator with minimum of disassembly (elevator door: 42" x 84"; elevator floor: 52" x 80" space between elevator side railings 48" x 73"). [Based on TEAMS museum constraints]
- Exhibit has fork lift points (for use by shipping companies) and adequate overall strength for easy handling.
- Exhibit is movable by 2 people.
- All internal parts, circuits, labels, etc. are securely fastened.
- Windows and mirrors are safety glass, tempered or plastic (less good because of scratching).
- Bases have levelers.
- All four sides are finished.
- Lexan is used where breakage or warping from moisture might be a problem.
- High-quality components are used throughout.
- Exhibit uses standard components and hardware to aid repairs.
- Spare custom parts are provided or in stock at originating museum.
- All reset or on/off switches are the same: i.e. 1/4" hole for pen or pencil
- Machine screws with tapped holes or T-nut bushings are used rather than wood screws or drywall screws wherever possible.
- Consider using hand cranks in place of reversing electric motors with center-off switches.
- Knobs have small radii or slip-clutches to limit force.
- Small, loose parts, such as viewers, have counterweights sliding in vertical tubes, with wire rope leashes passing through hardened bushings.

ACCESS

- Wherever possible, subsystems are removable for service.
- Adequate work space is provided in exhibit enclosure and circuit layouts.
- Frequently replaced items, such as lamps, are accessible through a hinged door or sliding panel with a lock.
- All service panels are secured with the minimum necessary hardware (flush mounted locks are best).
- All locks are keyed the same.

ELECTRICAL DESIGN

- Power cord(s) are grounded and fused.
- Exhibit power switches are easily accessible to the staff, but not to the public.
- All high voltages are conspicuously labeled.
- Power switches are double-pole and disconnect both sides of the line.
- All lethal voltages have special safety interlocks on access panels, with crowbar relays to discharge capacitors.
- All semiconductors that control relays are protected by reverse diodes.
- Variations in line voltages are provided for; computer-based exhibits have surge protectors
- A convenience power outlet is built into the exhibit for maintenance tools and for lighting during repairs.
- Components prone to failure (such as tape decks and foot switches) have quick-connectors.
- Power cords have complete strain relief.
- All wiring is shielded from sharp edges and abrasion.
- Movable components such as lamps and headsets have a special strain relief.
- All common adjustments are easily accessible and clearly labeled.
- All distinct subsystems can be isolated for testing and replacement.

VENTILATION

- Hot lamps and other components are vented and shielded from children's hands.
- Airspace is provided around all electrical packages.

- Convection openings are placed above and below all heat sources such as lamps, motors, and power supplies.
- Any moving air gets at least a "rough cleaning" via screen, hardware cloth, or foam filter.
- Filtered, forced air cooling is used if needed.
- Semiconductors (especially high-voltage ones) have heat sinks adequate for all weather (especially hot summer temperatures in the south).

MAINTENANCE AND REPAIR

- Complete checklist is drawn up for routine maintenance, with recommended intervals for checking levels, cleaning vents, lubrication, and so on, with an easy way to keep maintenance records.
- Parts subject to trauma are glued flexibly; if low stress, with silicone; in high stress, with Goop.
- Transparent surfaces can be cleaned from both sides.
- Exhibits can be cleaned with standard materials and equipment.
- Exhibits containing liquids are easy to drain and flush completely.
- Toe spaces are at least 4 in. high so a vacuum cleaner can fit underneath.
- Inside corners have cut-out pieces to allow vacuuming.
- Troubleshooting guides have been prepared when symptoms of failure are predictable.
- Surfaces are non-porous and resist wear and dirt (Plastic is usually cheaper than paint in the long run, except where chipping is probable).
- Laminate edges have solid hardwood edging wherever they are prone to catch and tear.
- No iron-on veneers are used.

CRATING

- Crates are painted (to show damage).
- Quick release or machine screw fasteners are used, not wood or lag screws for tops and openings.
- Objects fit only one way, if it makes a difference.
- Crates are moisture resistant or moisture proof, if necessary.
- Crates have handles where necessary.
- Crates have pallet jack or forklift spaces underneath.

- Crates are well-marked—top, fragile, how to open, size and weight; color coded for contents if appropriate.
- Sequence of putting in and taking out has been thought through to make it work easily because it will be done over and over.
- Diagram or snapshot of contents, properly packed, is permanently fixed inside each crate.
- Crates have a content listing attached to inside and available for mailing to host museum before exhibition arrives.

APPENDIX H

Elements of Educational Program Materials

When designing educational materials for TEAMS exhibitions, the following components should be included for each program activity:

- Title of the activity
- Overview of the concept
- Science content and background
- Related exhibits
- Time needed for the activity
- Age appropriateness
- Staffing (#, experience level needed: e.g. teen volunteers or professional educators)
- Safety issues to be aware of or other caveats
- Materials description (supplied, required, sources, Web)
- Procedures (preparation, real time, follow-up)
- Extensions to the activity, if time is available
- Related activities

APPENDIX I

Marketing Materials

Each TEAMS exhibition will include the following marketing materials as a minimum:

- Camera-ready logo
- Sample one-page press release
- Sample public service announcements (PSAs) for 15, 30, and 60 seconds
- One or two high-quality 8"x10" photos in color and black-and-white showing people at exhibits
- B-roll footage for creating video news releases (VNRs) [optional]
- Camera-ready files for banners or any other items produced [optional]
- Samples of ads produced [optional]
- Press clippings from earlier venues [optional]

TEAMS II FACILITIES

<i>MUSEUM</i>	<i>SHIPPING & RECEIVING</i>	<i>CRATE STORAGE</i>	<i>WORKSHOP</i>	<i>TRAVELING GALLERY LOCATION</i>
Rochester Museum & Science Center, Rochester, NY	Loading dock-loading and unloading of trucks at dock with dollies and hydraulic pallet jacks	limited both on- site and off-site	yes, in basement, accessible by freight elevator	3 options
Catawba Science Center Hickory, NC	No loading dock- load and unload from ground with forklift	off-site, donated	minimal 5' x 12' hallway, or offsite 15 min. away	ground floor
Discovery Center Museum, Rockford, IL	Loading dock-loading and unloading of trucks at dock with dollies and pallet jacks	limited on-site possible donated off-site	yes, in basement, accessible by freight elevator	2nd floor
Sciencenter, Ithaca, NY	Loading dock (1.5' above ground, so we'll make a temporary ramp if needed)	Off site donated storage space.	yes, in basement, accessible by passenger elevator	2nd floor
Montshire Museum of Science Norwich, VT	Loading dock with limited access- most from ground via liftgate or ramp. Trucks under 12'6" use dock & pallet jack		In lower level, accessible by passenger elevator only	2nd floor
Family Museum of Arts & Sciences Bettendorf, IA	Ground Level, no dock but use a fork lift for large items. Lift gate on truck for really long/tall crates	500 sq. feet on site	full cabinet shop with limited metal fabrication abilities	adjacent to loading dock
Health Adventure Museum Asheville, NC	loading dock- ramp to dock from truck	off site	limited	2nd floor elevator access

TEAMS II FACILITIES: TRAVELING GALLERY SPACE

<i>MUSEUM</i>	<i>FLOOR SPACE</i>	<i>CEILING HEIGHT</i>	<i>WALL SPACE</i>	<i>GALLERY ACCESS FOR EXHIBITS</i>	<i>ELECTRIC POWER ACCESS</i>
Rochester Museum & Science Center, Rochester, NY	smallest: 1500, largest: 2500	9' - 4"	yes	Freight elevator: 8' wide, 9' height, 12' length Pass. elevator: 9' wide, 7' height, 5' 10" length	wall outlets and track lighting (limited floor outlets)
Catawba Science Center Hickory, NC	43' X 70' 3,010 sq. ft.	12'	200 linear feet	exterior doors width: 9' 10" height: 8' 10"	wall outlets and in lighting grid
Discovery Center Museum, Rockford, IL	35' x 35' 1405 sq. ft. 10' x 18' addtl. avail.	10' 8"	30 lin. ft. 20' addtl portable walls avail.	Freight elevator: 8' wide, 9' high, 13' 8" deep	wall outlets and in lighting grid
Sciencenter, Ithaca, NY	50' x 50'	10'	80'	passenger elevator: 4' wide x 8' deep, doors: 4' wide x 7' tall	wall outlets, twist - lock outlets overhead
Montshire Museum of Science Norwich, VT	32' x 70' 2200 sq. ft. entire gallery will not be used for TEAMS exhibits	11' 0 clear ht. under light fixtures 10' 0"	120 lin. ft. addtl portable walls avail.	pass. elevator: 4' wide, 7' 3" wide, 6' 1" deep loading door: 6' W x 8' H	limited floor outlets, wall outlets -also power thru lighting grid (100 amp)
Family Museum of Arts & Sciences Bettendorf, IA	2000 sq ft	14'	140 running feet	8' X 8" loading door	ceiling and wall
Health Adventure Museum Asheville, NC	1800 sq ft	11' 6"	130 linear feet	loading door: 10'H X 12W' freight elevator 8'H x 6'W x 10'D	floor, ceiling and wall