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As science centers and museums welcome increasingly diverse audiences, many of them are working to accommodate the linguistic needs of their visitors and to foster a sense of ownership and belonging. Immigrants, indigenous populations, and visitors who are Deaf bring a variety of languages with them to science centers around the world. This issue will explore how centers are recruiting bilingual staff, reaching out to linguistically diverse communities, and constructing multilingual exhibitions, materials, and educational programs.

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Cover: Children explore the English/Spanish traveling exhibition Amazon Voyage, Vicious Fishes & Other Riches/Viaje al Amazonas, Peces Feroces y Otras Maravillas. The National Science Foundation–funded exhibition was developed and built by the Miami Science Museum, Florida, in consultation with the Science Museum of Minnesota, St. Paul; Randi Korn & Associates, Inc., Alexandria, Virginia; a team of North and South American scientists; and the artist Ray Troll. Photo courtesy the Miami Science Museum

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To submit news items and ideas for articles, contact Emily Schuster, editor, 202/783-7200 x130; e-mail eschuster@astc.org.
Over the course of 10 years, the exhibit team at the Miami Science Museum, Florida, has developed general guidelines and strategies for writing and designing bilingual exhibitions. These guidelines result from our experience producing Spanish-language interpretation for more than 40 bilingual exhibitions, and from much trial and error. Although these guidelines refer to English/Spanish interpretation, the principles can be applied to bilingual exhibitions in other languages.

There is certainly more to be learned, but let’s look at some of the basic issues. Following these strategies can lead to a more accessible and rewarding experience for all visitors.

**Both languages are equally important**

The same editorial review is necessary if you expect your second language to match the quality of the first. This might seem like a given, but I’ve come across many bilingual labels that prove otherwise. While some visitors will praise your institution for making the effort to provide the text in a second language, less forgiving ones might surmise that you didn’t care enough to do it right.

**The right people for the job**

A truly qualified translator and a savvy editor make for better text in both languages. The translator’s role is to replicate the meaning and mood of the original text as if it were originally conceived and written in the second language. The editor must review the text for grammatical errors and confirm that the structure and style sound authentic from a native speaker’s point of view. Remember that a proficient speaker of any language is not necessarily a proficient writer or editor, and a proficient translator is not necessarily equipped to write exhibit text.

The translator and editor, whether staff members or proven outside professionals, must be intimately familiar with the exhibit content. Their input is essential at the outset of exhibit development in determining how both languages can most closely mirror each other in terms of voice, tone, humor, and idiomatic expressions.

**Interpretation versus translation**

Your translator must be ready to search for the correct terms, play with syntax,
and interpret. Literal translation is usually not an option, especially when your meaning must be clearly conveyed in as few words as possible. Concise, digestible chunks of information are key to accommodating the second language on exhibit labels and panels. The extra wordsmithing necessary to deal with this constraint often helps to refine and clarify your message and reveals ways to improve upon the original English-language text. This results in text that is more likely to be read by speakers of both languages.

**Universal terms and familiar regional variations**

*Interpretation*, as opposed to a more literal translation, begins with identifying the most widely used word or expression for any given English equivalent. Both the translator and editor should be cognizant of the cultural makeup of your visitors. They should use universal terms whenever possible and select the regional variations most familiar to your visitors when necessary.

Common names for living things, objects, and actions in Spanish are often region specific. For example, different countries use different words to refer to a car. Most Spanish speakers are familiar with the terms *carro, coche,* and *auto,* but a Cuban accustomed to saying *carro* would feel odd using *coche,* just as someone from the United States might feel strange referring to his “apartment” as a “flat.”

It is particularly important to develop English and Spanish text in unison when using idiomatic expressions. For example, it’s important to have thought of appropriate Spanish-language phrases that capture the meaning of headings such as “Fish out of Water” or “Bone Up on Bones.” Moreover, the Spanish equivalent of colloquial expressions can vary by country or region. Spaniards, Mexicans, and Cubans have very different expressions for “That’s cool.” The point is not to shy away from whimsical language or idiomatic expressions, but to think about the text, especially titles and subtitles, at the start of the project.

**Layout and design**

The graphic design of bilingual text panels and other exhibit components can be just as challenging and rewarding as the text-writing process. The ostensible starting point is determining a word count based on visitor behavior, readability, and available space. Bilingual label copy must be kept short to avoid producing a wallpaper of words. This usually means aiming for 50- or 60-word chunks of text, with panel titles no less than 40 points and body copy around 24 points.

Color schemes, panel dimensions, and other practical considerations should also take the second language into account at the outset of exhibit development. Giving equal weight to both languages avoids the suggestion that one language or culture is more important than the other. Also, the clear separation and consistent placement of the two languages helps visitors quickly identify where to find English or Spanish text throughout the exhibit. Different background colors, text treatments, and creative placement of images can help accomplish these goals and create a label design as aesthetically pleasing as any single-language exhibit.

Of course, this whole endeavor is a dynamic process. Two weeks into a project, the writing team may ask the exhibit production manager for a few more inches of text panel real estate to accommodate longer-than-expected text. The graphic designer may ask the same exhibit production manager for larger panels to accommodate certain graphic elements. The production manager may come back and say that the writers and designers can have an extra two inches, and not the four they requested, because he can’t get a certain material in a given size without going over budget.

This not-so-fictional account highlights the very real give-and-take that results in better exhibit products and visitor experiences. The writing team inevitably returns with yet more concise, effective text, and the designers become ever more creative with the use of color and design, therefore adding to the visual appeal and success of the content.

Ideally, these efforts should be part of a larger museumwide plan to reach and serve your Spanish-speaking and bilingual audiences. A bilingual web site, outreach programs, special events, and partnerships with universities and Spanish-language media outlets will help spread the word—**¡Este museo es para todos!** (This museum is for everyone!)

Carlos Plaza is exhibit developer and bilingual communications specialist at the Miami Science Museum, Florida.

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**Design Guidelines**

- Develop consistent size, arrangement, and aesthetics for all interpretive text.
- Give equal weight to both languages in terms of font size, headlines, etc.
- Clearly separate the two languages visually. Consider using different colors for the backgrounds and/or text.
- Be consistent with the placement of graphic elements.
- Avoid repeating the same images on one panel.
- Test and modify as necessary.
The Languages of Science in Wales

By Chris Mason

The Welsh language was once considered to be in its final years. The prevalence of English, both nationally and internationally, led to a decline in the use of Welsh. This decline continued as Welsh speakers from rural areas moved to cities in search of work, and English speakers migrated to rural areas during the 20th century.

Welsh has enjoyed a renaissance since the 1990s, particularly with younger residents, who are proud to keep it alive. This change was borne out of an era known as “Cool Cymru.” (Cymru is Welsh for Wales.) The rise in popularity of movie stars like Catherine Zeta-Jones and rock bands like Manic Street Preachers gave the youth of Wales a definite identity—it was cool to be Welsh. Wales’s primary distinguishing factor is its language, and the Cool Cymru era raised the status of the language accordingly. Figures released in 2003 showed that 37.7 percent of children ages 3 to 15 in Wales can speak the language. This indicates a hopeful future.

Since devolution 10 years ago, Wales has been governed by the Welsh Assembly Government, which provides a portion of Techniquest’s core funding. The devolved government has policy-making responsibility for many issues, while others remain the responsibility of central U.K. government. The Assembly has brought the Welsh language agenda to the forefront of Welsh politics. Welsh is now considered an official language of Europe and is spoken at the European Parliament in Brussels.

Bilingualism at Techniquest

As the leading science discovery center in Wales, Techniquest has a responsibility to represent the Welsh language equally in its activities. However, presenting bilingual content is, at times, easier said than done.

The written word is easiest to handle. Publications, signage, and exhibit labels can be sent to external translators prior to publication. This, in itself, presents challenges, however: The translation must be accurate and also written in a style suitable to the document at hand. This has taken a great deal of trial and error to achieve. By working with us regularly, our translators have developed an understanding of our organizational aims and house style.

Techniquest’s award-winning design scheme ensures visitors are easily able to find their way through the center. Guided by bilingual labels, visitors to Techniquest in Wales play with a giant electric piano. Photo courtesy Techniquest

Continued on page 9
Secrets of Circles: Evaluation of a Trilingual Exhibition

By Sue Allen

Secrets of Circles, a 2,600-square-foot traveling exhibition created by the Children’s Discovery Museum of San Jose (CDM) in California, was designed to be particularly inviting to families of Latino and Vietnamese descent, the largest ethnic groups in San Jose. In service of that goal, every label in the exhibition was trilingual, in English, Spanish, and Vietnamese. Summative evaluation of the exhibition included a focus on the trilingual labels, because CDM staff wondered whether these would be understood and embraced by the general public, or whether they would feel overwhelming or even alienating.

CDM serves an average of 300,000 visitors each year. Of these, 21 percent are Latino, 17 percent are Asian American or Pacific Islander, 4 percent are African American, and 58 percent are white. Secrets of Circles, funded by the Informal Science Education Program of the National Science Foundation, was designed to promote explorations of circles and wheels in everyday life. Circles have unique properties that make them effective as engineering and design tools, and they are ubiquitous in cultures around the world. The main audience for the exhibition was children ages 3–10 and their parents or other caregivers.

As part of the evaluation, 107 adults, all visiting with children on a weekend or holiday, participated in an interview about the exhibition. Of these, 77 percent spoke English (58 percent spoke English only), 8 percent spoke Spanish, 4 percent spoke Vietnamese, and 13 percent spoke Chinese. Interviews were conducted in the language of visitors’ choice by three bilingual interviewers, who were native speakers of English and either Spanish or Vietnamese.

General reactions to trilingual labels

Interview data suggested that adults found the trilingual labels understandable and easy to use. A total of 82 percent said they had read or used at least some of the labels, though this was difficult to confirm because most were so brief that they could be read “at a glance.” The labels did appear to play a key role in promoting understanding: 91 percent of visitors whose home language was represented in the labels correctly identified the circles theme, compared with 62 percent of visitors whose home languages were not represented. This suggests that the main theme of the exhibition relied, at least in part, on labels in visitors’ home languages for its effective communication.

Almost two-thirds of all adults (62 percent) had a clear and positive response to the multilingual labels. Comments from these supporters fell into three main categories, based on whom they perceived as the benefiting audience. The first category consisted of the 6 percent of all adults who felt such labels would help them personally to understand an exhibition. One remarked, “It’s great—our family is bilingual.” Another 28 percent felt such labels would help others from different cultures and linguistic groups. One said, “Different people can read them; you get a better explanation.” In the third category were the 7 percent who felt such labels would help people who were trying to learn a new language. One respondent commented, “My son is actively learning...
Spanish, so it was nice for him to read signs in Spanish.” Four respondents asked for even more languages, such as Chinese or Japanese.

Thirty percent had neutral responses to the trilingual labels (such as “Fine” and “I don’t really care.”) Only 3 percent of the adults had something negative to say about the multilingual labels (such as “Aren’t we supposed to be an English-speaking state?” and “I get distracted when I can’t find English.”)

Finally, visitors were asked whether they would recommend that the museum create labels only in English or in other languages as well. Only 2 percent of the adult visitors recommended English only, 11 percent had no preference, and fully 86 percent said they would recommend that labels be in English and other languages. It is worth mentioning that most of those who supported multilingual labels (54 out of 92) said that the language they mostly speak at home was English, so these were not just people who personally needed the multilingual labels.

Reactions of Latino families

Of the 107 adults interviewed, 11 (10 percent) said they spoke Spanish at home, or self-identified as Latino, Mexican, or Hispanic. When asked what they thought of the trilingual labels, all 11 of these adults gave immediate positive responses. One commented that it was “excellent that [the exhibition] caters to different groups.” Unsurprisingly, these adults also unanimously recommended that CDM create labels in English as well as other languages. Of those adults who noticed the multilingual labels, 92 percent had a positive reaction. One remarked, “I think it’s fabulous because it exposes children to different languages and cultures.” Like the Latinos in the general visiting audience, these adults unanimously recommended that CDM create labels in English as well as other languages. One stated, “We want our kids to be bilingual—more multicultural.” Another person added that her child had learned something specific because of the multilingual labels: “He just associated ‘circles’ with the Spanish word ‘círculos.’”

Reactions of Vietnamese-descent families

Interviews with the general audience showed that very few Vietnamese families were visiting the exhibition. It was therefore decided to invite eight Vietnamese families (in which the adults spoke mostly Vietnamese), as well as a Vietnamese community leader, to view the exhibition and give their in-depth feedback.

These families were observed using the Vietnamese text on the labels in a variety of ways:
• An adult reading the Vietnamese labels to understand the exhibition for herself/himself
• An adult reading the Vietnamese labels out loud to help a child
• A young adult reading both the English and Vietnamese versions to understand the exhibition fully
• A school-aged child reading both the English and Vietnamese versions as a way to help him learn both languages
• An adult checking the correctness of the translation from English to Vietnamese.

When asked, almost all families were very positive about the trilingual labels. One parent was dismissive, explaining that he assumed the labels were compulsory in public places. However, the other seven families saw them as providing access to the exhibition for Vietnamese speakers, a way for English-speaking children to further their Vietnamese language skills, and a form of outreach to the Vietnamese community. One visitor remarked, “Next time, we’ll bring the children’s grandparents to the museum—they would be thrilled if they could read Vietnamese labels and explain how things work to their grandchildren.” Another commented, “These labels show that the museum takes the diversity in San Jose’s multiple cultures seriously. This makes me proud of our community.”

In summary, the multilingual labels in Secrets of Circles were well received and thematically effective. Support for multilingual labels was very strong, not just among speakers of Spanish or Vietnamese, but across the spectrum of languages and cultures of CDM visitors. Keeping the labels very brief, connected to daily life, and consistently colored (i.e., each language had the same color on all labels) seemed to help reduce the potential for visitor overwhelm. Overall, the evaluation indicated that the multilingual labels made mathematical content accessible to visitors, facilitated thematic understanding, and were enthusiastically received by visitors.

Sue Allen is principal of Allen & Associates, an evaluation consulting firm based in San Mateo, California. This article is adapted from her summative evaluation report on Secrets of Circles, available at http://informalscience.org/evaluation/show/115.
Sharing Yup’ik Language, Knowledge, and Heritage

By Ann Fienup-Riordan

A young boy tries on replica 19th-century Yup’ik wooden snow goggles in the exhibition Yuungnaqpiallerput at the cultural center in Bethel, Alaska. Photo by Suzi Jones

Yup’ik elder Paul John said, “In this whole world, whoever we are, if people speak using their own language, they will be presenting their identity, and it will be their strength.” As curator of Yuungnaqpiallerput/The Way We Genuinely Live: Masterworks of Yup’ik Science and Survival, I worked collaboratively with Paul and a team of 12 Yup’ik elders and educators to explore 19th-century Yup’ik science and technology—and to bring this traditional knowledge to contemporary young people. Yup’ik Eskimo—the primary language of two-thirds of the 23,000 residents of southwest Alaska—was an essential part of every aspect of the project.

The exhibition is a joint project of the Calista Elders Council (the primary heritage organization in southwest Alaska) and the Anchorage Museum, with support from the National Science Foundation’s Informal Science Education Program and the Anchorage Museum Association. We opened the exhibition at Bethel, Alaska’s Yup’ik Piciryarait Cultural Center in September 2007 and moved it to the Anchorage Museum in February 2008. Although 95 percent of our visitors in Anchorage were non-Yup’ik speakers, we continued to foreground the Yup’ik language in everything we did.

Along with over 200 pieces of 19th-century Yup’ik technology, the exhibition includes bilingual panels; science interactives featuring quotations from Yup’ik elders, including a language interactive where visitors can learn to speak Yup’ik words and simple sentences; listening stations where visitors can listen to stories in Yup’ik and English; short videos in Yup’ik with English subtitles; two catalogs (one English and one bilingual); and a web site including elders’ quotes in Yup’ik and English (www.yupikscience.com). This wealth of information derives from hundreds of hours of information shared by Yup’ik elders in their own language and painstakingly transcribed and translated by Yup’ik language experts Alice Rearden and Marie Meade.

Traditional knowledge

The exhibition resulted from the Calista Elders Council’s desire to bring museum objects home. Repatriation was not the issue, as ownership of objects was not the goal. Rather, “visual repatriation” was what they sought—the opportunity to show and explain traditional technology to young people. As European-American influence increased in southwest Alaska slowly but steadily increased in the 19th and 20th centuries, traditional knowledge and language began to decline. Many believe that now is the time to address this erosion of language and traditional values, before the last generation of elders raised in the traditional ways disappears.

Paul John noted, “We are losing our way of life, and we need to help young people and others better understand what they’ve lost.” The truth of his word was brought home to me in April 2003 when I listened to Jeffery Curtis, a Yup’ik high school student, speak publicly about his recent visit to Anchorage. He said how glad he was to have the opportunity to visit the University of Alaska, where he planned to study science, because his ancestors had no science and he wanted to learn what white people could teach. Jeff comes from a proud and talented family, and his grandfather, Phillip Moses, is a master kayak builder with expert knowledge on many aspects of Yup’ik technology. Jeff knows this, but nowhere has he learned to respect his grandfather’s traditional knowledge as “science.”

I was given the opportunity to understand some of Phillip Moses’ knowledge, and that of his ancestors, as I worked with him and my partner, Alice Rearden, in the Anchorage Museum collections. Phillip passed a pair of wooden snow goggles to me and then launched into an enthusiastic explanation of how they were the original “Yup’ik prescription sunglasses.” Half listening, I held the goggles to my eyes, and for the first time since my retinal surgery two weeks earlier, I could see! As I digested the sophisticated design—thin slits that focused the light like a pinhole camera, enhancing the user’s vision—I could hear Phillip relating in Yup’ik how the goggles worked both to reduce glare and help a hunter see far.

Elder Elsie Mather observed, “Our language had no word for science, yet our tools were so well designed that they allowed us to live in a land no one else
would inhabit.” By choosing a “science” focus for the exhibition, ‘Yup’ik community members continued to advocate for respect for their knowledge systems. ‘Yup’ik technology was developed through experimentation, as men and women learned to construct and work with tools through trial and error.

The value of considering Western scientific approaches side by side with those of Yup’ik traditional knowledge cannot be overstated. Yup’ik grade school principal Agatha John-Shield articulated the dilemma of her generation: “When I was in school, I hated science. I couldn’t understand it. Not only was it in another language [English], but all the examples were foreign. If we begin to speak of ‘Yup’ik science,’ we will give our children something they can understand.”

**Collaboration and authorship**

Had we not done the exhibition the way we did, had the Yup’ik community not been involved from the beginning, the results of all our planning might not simply be neutral; they could be hurtful. If, as a non-Native researcher, I work without community involvement, I take away authorship and undercut ownership. Collaboration is much more than a matter of respect. An outsider’s exhibition, however accurate, runs the risk of putting Alaska Natives at arm’s length from the objects of their past.

As we worked on label copy, I would look at the interview transcripts and inevitably find that an elder had said it better than I ever could. Even more important than preserving the vitality of texts, foregrounding particular elders lets Yup’ik visitors recognize authorship, and own it in ways no restatement of mine ever could. Presenting quotes in the original Yup’ik (along with an English translation) strengthens this sense of ownership.

In the end, this exhibition is first and foremost about **sharing knowledge**.

In making this exhibition, we have learned much about Yup’ik science. We have also been taught something about life, from the Yup’ik point of view. Paul John has always told me about my opportunity to learn the Yup’ik language, “You’re very lucky, Anna.” Now, thanks to him and to men and women like him, we’re all lucky in the rare view of the past we’ve been given, as well as an understanding of the meaning this past still holds for people in Alaska today.

Ann Fienup-Riordan, a cultural anthropologist, is curator of Yuungnaqpiallerput/The Way We Genuinely Live: Masterworks of Yup’ik Science and Survival, which will travel to the Smithsonian’s National Museum of Natural History, Washington, D.C., in March 2010.

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*Continued from page 5* to find the language they wish to use. On signs and labels, English is always written in red and Welsh in green. These colors are drawn from the Welsh flag, further enhancing the Welsh image of the center.

Bilingualism also presents challenges for marketing staff. As the two languages need equal status and space on any leaflet, the available word count is halved, requiring great creativity in conveying the message. Techniquest’s latest leaflet contains only around 200 words. Our current marketing team has opted for a pictorial approach, bypassing language issues. They say a picture is worth a thousand words—it also conveys those words in whatever language you choose!

By far the biggest challenge to offering bilingual service is the recruitment of bilingual staff. There is a great demand for Welsh speakers in all sectors in Wales, so highly skilled science communicators are hard to find. Around 600 schools in Wales teach exclusively through the medium of Welsh, so highly skilled science communicators are hard to find. Around 600 schools in Wales teach exclusively through the medium of Welsh, or have Welsh as the main language of learning, and Techniquest relies on a small core of Welsh-speaking staff to deliver programs to those schools. This challenge became especially acute when we expanded our schools’ outreach service to northwest Wales, where Welsh is widely spoken. Welsh language skills continue to be one of the most important “boxes” for job applicants to check.

In the past, some people have seen Welsh as a problem, and even as a barrier to success, but attitudes have changed. People take pride in the language, and the Welsh tourism industry has realized the benefits in promoting this distinct difference from the rest of the United Kingdom. Techniquest is in a prime position to capitalize on this advantage, by using the beauty of the Welsh language to create a unique scientific experience.

Chris Mason is visitor services manager at Techniquest, Cardiff, Wales, United Kingdom.
Marbles, water, prisms, gears. Canicas, agua, prismas, engranajes. These are words, symbols that many of us recognize. However, what they mean to us depends on our experiences with the objects they represent and on what we choose to do with the objects once they are in our hands.

At Explora in Albuquerque, New Mexico, we provide this direct experience with physical materials. Once we have chosen the right materials, it is the “stuff” that does the teaching. Then language can become transparent, a supporting cast member in a learning ensemble of materials and equipment, the physical environment, and the people nearby. If the language is transparent, learners can see through it and focus on the materials, without the language becoming a distraction. We must make the learning environment comfortable enough that visitors can intuitively, by free choice, use the language that feels most natural for the current activity.

This approach is important because in our community, almost 40 percent of the population speaks a language other than English. This is primarily Spanish, followed by 12 Native languages. On most days at Explora, there are nearly as many Spanish-speaking as English-speaking visitors. When visitors arrive at the front desk, a banner greets them with “Welcome to Explora. Bienvenidos a Explora.” They read questions, in both Spanish and English, encouraging them to investigate. They notice bilingual background information tucked next to exhibit activities.

Most importantly, they encounter staff ready to share activities with them in either English or Spanish. In fact, 45 percent of Explora’s staff is bilingual, primarily in English and Spanish, although 11 languages are represented. Staff that speaks the same languages as the visitors is a crucial element of a learning environment in which visitors intuitively use the most comfortable language. The staff is able to respond in kind. For example, Explora’s 207 different Classroom Explorations, which take place on-site or as outreach programs, are offered in either English or Spanish. However, even in programs facilitated in English, there is often a table of students who can be overheard whispering to each other in Spanish. When a bilingual educator approaches and uses Spanish to invite them to explore, a barrier has been overcome. The language is able to become invisible as the students manipulate the materials and share their discoveries, much more loudly and confidently, in Spanish.

Twice a month, Explora hosts bilingual Family Science Nights through a partnership with our local school district’s Title I program, which serves schools with high student poverty rates. Greeters at the front door welcome the families in Spanish and English, inviting them to join us for dinner and to explore the exhibits. On these evenings, we hear whole families speaking only in Spanish. We hear grandparents speaking in Spanish to their grandchildren, who answer in English. We hear families switching fluidly from one language to the other. This feels like evidence that our environment enables language to become transparent and allows families to focus on what they are doing with the open-ended materials provided.

Visitors for whom English is not the most natural language often tell us how surprised they were to find out their language fit so easily into their time at Explora. They often share their excitement with our bilingual staff and through comment cards written in Spanish: “Soy una abuelita que se divirtió con su nieto de 2½ años. Los felicito por pensar en los niños que hablan español, y gracias por su gran esfuerzo. ¡Mil gracias!” ("I am a grandma who shared a good time with her 2½-year-old grandson. Congratulations for thinking of the children who speak Spanish, and thank you for your efforts. Thanks a lot!")

Derlly González is bilingual programs coordinator, and Kristin Leigh is educational services director, at Explora, Albuquerque, New Mexico.
English is inarguably the most popular medium for communicating science internationally. This predisposition marginalizes non-native English speakers from engaging with science. In order to facilitate science communication on an international scale, Sri Lanka, like several other countries, has decided to teach science and other subjects in English. However, teaching science in a non-native language raises various challenges, which I will address below.

Language, politics, and science

Sinhala, the mother tongue of Sri Lanka’s Sinhalese ethnic majority, was recognized as the country’s first official language in 1956, after Sri Lanka gained its independence from British rule in 1948. Tamil, spoken by the large Tamilian minority, became the second official language, followed by English as the third. As a result of this nationalist endeavor, English, which was the medium of administration and education in colonial Sri Lanka (then known as Ceylon), was gradually phased out. Sinhala and Tamil replaced English as mediums of secondary level instruction, depending on the ethnic populations in different parts of the country. In my own experience as a student in Sri Lanka, I studied science in the Sinhala medium. Sinhala and Tamil also permeated progressively through to tertiary level education, with the exception of professional degrees like medicine, engineering, and some sciences, which are still taught in English.

However, mother tongue–based science education has been hard pressed to keep up with the pace of science and technology literature. For instance, new Sinhala and Tamil words need to be created to describe Western scientific concepts. In addition, many Sri Lankan universities are required to conduct intensive English-language programs as prerequisites for science and technology courses. Despite these efforts, the Sri Lankan public’s engagement with science at an informal level, including at science centers and museums, continues to suffer due to the need to communicate simultaneously in Sinhala, Tamil, and English. Policy-makers and educators agree that a more inclusive resolution needs to be adopted if Sri Lanka is to interact with science and technology at an international level.

Reintroducing English medium instruction

In 2002, the Ministry of Education and the National Education Commission in Sri Lanka issued plans to reintroduce English as the medium of instruction at all grades in state-funded schools. They emphasized in particular the teaching of science, mathematics, and technology in the English medium, to help students engage with international developments. The plans acknowledge that proficiency in English is important for higher education and career advancement of all students.

The revival of English medium instruction was also influenced by developments in the private education sector in Sri Lanka. The admission of domestic students to secondary education institutions intended for expatriates living in Sri Lanka was one such precursor. Since the 1980s there emerged, consequently, what are known as international schools. These schools teach all subjects in English while subscribing to U.K. textbooks and curricula. The exponential emergence of more affordable international schools catalyzed the government’s decision to reintroduce English medium instruction in state-funded schools.

Post 2002, English medium instruction was reintroduced to Sri Lankan schools in gradual stages, starting with middle school. However, these reforms were not absorbed uniformly by all

Continued on page 13
Expanding Informal Science Education for Latinos

By Robert L. Russell and Malu Jimenez

In March, educators from across the United States met at the Expanding Informal Science Education for Latinos conference in Albuquerque, New Mexico, convened by the Self Reliance Foundation (SRF) and supported with funding from the National Science Foundation (NSF). (See the sidebar article below and “ASTC Notes” on page 17.) This topic seems more important now than ever as Latino populations in the United States continue to grow. The following points reflect general trends and social indicators in the U.S. Latino community. Most were derived from the conference background briefing papers.

General trends

- *The Latino population is growing fast.* Numbering over 44 million, Latinos are now the largest ethnic/racial minority group in the United States. In recent years, one of every two new U.S. residents has been Latino.
- *The Latino population is not homogeneous.* Latinos include U.S.-born and immigrant residents who come from more than 20 different countries and have varied levels of education, acculturation, English-language proficiency, and income. This diversity is clearly important when designing educational programs or media for Latinos.
- *Spanish is still important for communicating with Latinos.* While research shows that Latinos are learning English at the same rate as large immigrant populations from the past, over two-thirds of Latino adults use Spanish at home.

Latinos and education

- *Latino parents frequently have high educational aspirations for their children.* When choosing a leisure time activity, they are more likely to choose one that they perceive has some educational value over one that seems merely “fun.”
- *Some Latinos may define education*...

The Self Reliance Foundation and Science Education

The Self Reliance Foundation (SRF), Washington, D.C., was founded in 1979 as a nonprofit organization that used media, primarily radio and video documentaries, to link Latinos and Native Americans in the southwestern United States with information on how to become self-sufficient by accessing community resources. Today, SRF’s Acceso Hispano initiative encompasses all of our efforts to empower and educate Latinos throughout the United States (www.accesohispano.org). Science, technology, health, and the environment have always been important issues for Latinos and SRF.

Through one of our programs, the National Science Foundation–funded Celebra la Ciencia project (www.celebralaciencia.org), SRF combines the power of mass media with the immediate engagement of hands-on science. The broad goal of this project is to link Latino students and families with the rich science resources available in most communities. SRF has helped organize coalitions of science museums, zoos, universities, community organizations, and like organizations through this initiative. These coalitions, now active in nine regions around the United States, continue to organize science festivals and afterschool, outreach, and other programs designed to engage Latino students and families in science. ASTC members, such as the Pacific Science Center, Seattle, and the New Mexico Museum of Natural History and Science, Albuquerque, are among SRF’s strongest partners in Celebra la Ciencia.

Continuing this emphasis on science, technology, health, and the environment, SRF has developed educational media initiatives on such topics as health and the human body, cancer, energy, human genome research, and science careers. With NSF support, SRF has launched the first Spanish-language science and health news service, ConCiencia/Hispanic Science Newswire (www.conciencianews.com), which disseminates original, research-based news stories each week to over 100 Spanish-language newspapers throughout the United States and Latin America.

In March 2009, SRF convened the Expanding Informal Science Education for Latinos conference in Albuquerque, bringing together 125 representatives from science and children’s museums, youth organizations, universities, Latino science and engineering societies, and government agencies. The participants defined challenges and existing resources and used the conference as a foundation for designing new collaborations and initiatives.

Looking into the future, we plan to continue and expand our current initiatives, Celebra la Ciencia and ConCiencia/Hispanic Science Newswire, while developing new initiatives, including a science career support system for Latino students and expanded collaborations with science centers throughout Latin America.

—R.L.R.
more broadly than mainstream U.S. culture does. When defining education, many Latino families include social and ethical education in addition to what happens in school. They may perceive parents and teachers as filling different educational roles, with parents responsible for the social and ethical education of their children and teachers responsible for formal education. • Role models and mentoring are vitally important. Many Latino science professionals have described the importance of teachers and other role models in guiding and supporting their career choices.

Potential barriers
• Science education opportunities are not keeping pace with the needs of the Latino community. Overall, Latino students score lower on math and science achievement tests than national averages and are underrepresented in undergraduate and graduate science and engineering programs. • Latino families do not have great access to informal science resources. Latino families are underrepresented among those who visit science centers and other similar institutions. Latino students are underenrolled in after-school programs. There is no Spanish-language National Public Radio or Public Broadcasting Service, and there is little science available on Spanish-language media, including radio, television, and newspapers. • Cultural barriers may discourage Latinos from visiting museums. Infrequent museumgoers may believe that you need to know about the conventions and subject matter of a museum before you go. Some Latinos may also feel unwelcome in museums because of a lack of cultural relevance, interpretation in Spanish, or visitors or staff that are like them.

Planning for Latino audiences
• When planning programs, involve the audience. Use members of the community to help you plan programs. As you build trust with the community, recognize that it takes time. Working with community “gatekeepers” or “cultural brokers” may facilitate the process. • When planning media for Latinos, know your audience. In the average week, Latinos watch over 17 hours of Spanish-language television and listen to over 12 hours of Spanish-language radio. In addition, the majority read Spanish-language newspapers. To support your message, use popular and well-trusted media, consider the literacy levels and language preferences of the target audience, use native speakers to write or translate, keep messages simple and clear, and use multiple mediums (e.g., radio plus outreach at the church or community center). • Plan for families. Many Latino families use leisure time to promote and build family unity. Informal learning experiences that involve the entire family, even including cousins, uncles, and grandparents, may be very attractive to Latino families. • Use culturally competent staff. Language competence, cultural understanding, and respect for traditions and values are some of the qualities organizations should look for in staff. • Evaluate. Evaluation is an essential tool in understanding the participants in a program, so that language issues, context, trust, and other challenges can be taken into consideration during planning. Evaluators need to acknowledge their biases, use the community to help analyze proposed evaluation methods, talk to other evaluators experienced in culturally appropriate evaluation, and field test evaluation methods.

These “broad brush” observations barely scratch the surface of the richness of the discussions and the depth of observation made in the background briefing papers prepared for the Expanding Informal Science Education for Latinos conference. If you would like to hear more about the conference, read the briefing papers and join this developing learning community at http://scienceforlatinos.ning.com.

Robert L. Russell is director of science and health programs, and Malu Jimenez is senior program director, at the Self Reliance Foundation, Washington, D.C.

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schools in the country. While provincial schools often continue to teach in Sinhala or Tamil, only schools in the country’s provincial capitals, like Colombo, Galle, and Kandy, have better access to teachers and resources in the English medium. Even in these schools, the reintroduction of English medium instruction has not been consistent.

Inconsistencies and challenges

I have identified three such inconsistencies that impede the government’s initiatives to reintroduce English as the medium of instruction, particularly for science. I made these observations in Sri Lanka while collecting data for my Ph.D. research, which focused on science teacher professional development.

1. Teaching in the English medium is not practiced consistently across all middle school grades. Often, students who are more proficient in English are grouped into classes where they are taught in the English medium. These students are essentially those who already have more access to the English language and are able to afford resources like English medium textbooks. Needless to say, this strategy defeats the efforts by the government to improve the English proficiency of all students.

2. The lack of freely available prescribed texts in English, particularly for science, poses a significant challenge for both students and teachers. Despite the considerable time and funds the National Education Commission committed to producing an English medium textbook for science, this document does not address sufficiently the difficulties faced by Sri Lankan students, who are essentially nonnative speakers of English. It is already a challenge for non-Western students to negotiate the cultural boundaries between their home cultures and the apparent Western culture of modern science. Assimilating scien-
Addressing Deaf Visitors with an American Sign Language Multimedia Tour

By Christine Reich and Elissa Chin

With our strong commitment to universal design and to the inclusion of people with disabilities in informal science learning, it was a natural choice for the Museum of Science, Boston, to provide for Deaf visitors a guide to the exhibition Star Wars: Where Science Meets Imagination in their own language. Leveraging the video capabilities of handheld devices, we developed an American Sign Language (ASL) version of the exhibition’s Multimedia Tour (MMT).

Multimedia tours have the potential to better serve visitors who are Deaf than most other information delivery devices. These tours can deliver personalized video clips and animations, which work well for Deaf visitors as they tend to be visual learners. In addition, video is the only way (outside of person-to-person interactions) to convey information through ASL. English is a second language for many people in the United States who are Deaf (whose primary language is ASL). Further, people who are Deaf generally have lower reading comprehension levels, given that their English language acquisition is affected by their inability to hear oral discourse. This can make reading traditional text labels in exhibitions a challenge.

According to Nancy Proctor, of multimedia tour company Antenna Audio, a good sign language MMT has high quality signers; a great story with appropriate drama, effect, and atmosphere; subtitles to strengthen understanding; large text for low vision visitors; high contrast; and a sign language glossary of new vocabulary. In terms of operations, a good tour also has a neck strap, awareness training for visitor services staff, and a signed instructional video at the distribution center.

The traveling Star Wars exhibition, supported by the National Science Foundation, premiered at the museum in October 2005. The original handheld MMT, which was produced in conjunction with Antenna Audio, had 22 stops that featured interviews with Star Wars film producers and explanations of real-world technologies. The ASL MMT featured nearly the same content, with a woman translating the narration; the interviews with Star Wars producers were displayed with captioning.

Positive experiences

In December 2005, two groups of Deaf adults (ages 18 to 40) participated in focus groups exploring the ASL MMT. It cannot be overemphasized how thrilled participants were with the idea of experiencing the exhibition in their native language. The ASL tour represented the opening up of museum doors to the Deaf, and it was a warmly received gesture.

Many Deaf individuals declared that the handheld provided a sense of inde-
pendsence and control over the experience that they normally would not have. They did not have to arrange for an interpreter, which is a difficult task with a long waiting list, and they could experience the exhibition at their own pace, not the interpreter’s.

Interestingly, although the museum and hearing public conceptualized the handheld as an added experience, many Deaf individuals said that without the handheld, “We wouldn’t have any information.” Conceivably, they meant that it would have been significantly more difficult to access exhibition components that were not in their primary language.

In addition, the handheld provided Deaf visitors with access to information they might have had difficulty gleanin from a crowded exhibition. For example, Deaf visitors do not have the luxury of listening to a video from five feet away while peeking over other visitors’ shoulders. Instead, they have to stand close enough to see the captioned text.

Participants remarked on how wonderful it would be if the Museum of Science had a handheld tour of the entire museum. Moreover, they said that it would be amazing if all museums had an ASL tour, including wayfinding mechanisms to help visitors locate exhibits and show times.

Room for improvement

Overall, the handheld ASL MMT is an honorable first step in including an important population. Visitors felt much more comfortable and at ease having information in their own language. Yet there is much room for improvement as this is a relatively new field and audience.

1. Issues with the handheld’s design

Many Deaf handheld users felt they had to continually “look up and down” and make a choice between what to see; unlike hearing visitors, they did not have the option to listen and watch at the same time. Deaf visitors recommended that we build in pauses to allow Deaf visitors to cycle between the ASL tour and the exhibition. Also, the captioning lagged a second or two behind and was constricted by the small space of the handheld’s screen. Some suggested translating the interviews in an abbreviated fashion. Both focus groups unanimously agreed that the “signing image was too small.” It is important to remember that many Deaf individuals also have low vision.

2. Differences in learning styles and preferences

Deaf individuals generally prefer to learn from and interact with the world visually. Multimedia tours should have plenty of imagery and video clips of artifacts in motion or in creation phases.

3. Going beyond direct translation

An ASL tour must be more than a direct translation of a hearing tour. By simply translating the in-depth information of the Star Wars hearing MMT, we missed providing the basic information that was on the exhibit labels.

Recommendations

If we created an ASL MMT today, we would make the following improvements.

• Prototype with Deaf users before making handheld multimedia tours public.
• Go through the exhibition using only the ASL or text versions of tours to gain a better understanding of the timing for Deaf visitors. Also, include individuals who are Deaf in the planning process.
• Display short messages with a greater emphasis on the visuals, and consider using animations.
• Allow for more interaction with the exhibition and the visitor’s social group.
• Have a larger interpreter image, focusing on the waist up.
• Experiment with more text captioning options, including the ability to read larger chunks at a time.
• Create a small pamphlet with an outline of each stop’s content.
• Train frontline staff on how to work with blind and Deaf individuals.
• Implement an ASL video at the front desk to instruct Deaf visitors on how to use the tour and serve as an advertisement to the Deaf.
• Prominently market the handheld with captioning or interpretation symbols. Without these, Deaf individuals naturally assume a service is not Deaf friendly (especially since the tour came with headphones for hearing visitors).

Inclusion through technology

While the handheld ASL MMT was valued in many regards, having a tour with or without ASL capabilities was not absolutely necessary in a hands-on, multimedia-based exhibition. However, for many, the tour provided an invaluable experience by providing more easily understood information. As a science museum, it is important for us to welcome the Deaf community through technology, communicating an important message: “You have a place here.”

As it becomes easier to incorporate ASL in video-based technologies, museums should think about how to help Deaf individuals access learning in their primary language. Many focus group participants said that if such handhelds were prevalent and well advertised, the Deaf community would be more likely to visit museums, providing another source of revenue. The Deaf are an important audience we should and can reach much more easily through the advancement of technologies.

Christine Reich is manager of research and evaluation at the Museum of Science, Boston. Elisa Chin, formerly senior research and evaluation assistant at the Museum of Science, is currently research analyst at Eduventures. This article was adapted from “Life in Translation: Addressing Deaf Visitors in Museums with an American Sign Language (ASL) Multimedia Tour: Research Article,” originally published in July 2006.

Visitors build their own “landspeeders” in the Star Wars exhibition.
Continued from page 13

Scientific information in a foreign language adds an extra layer of difficulty for these students and their teachers. The present science text in English poses significant language and cultural gaps, which need to be bridged before students in Sri Lanka can confidently and meaningfully learn science in English.

3. Lastly and most significantly, there is a lack of teachers trained to teach subjects, including science, in English. This deficiency results directly from the post-Independence introduction of mother tongue–based instruction. Until as recently as 1990, there were teachers trained to teach in the English medium, but they belonged to an aging population that was educated in English. Therefore, when English medium instruction was reintroduced in 2002, there was a shortage of teachers trained to teach science in English. While most science graduates who are proficient in English are hired to teach at international schools, the English medium science teachers in state-funded schools do not have the benefit of English medium instruction at the secondary level nor adequate tertiary level training. Although inservice training is currently offered to this latter group of science teachers, these efforts need to focus more on long-term outcomes, such as the teachers’ proficiency in English and their awareness of the history and philosophy of Western science. These efforts also need to extend to science teachers outside the provincial capital cities.

While it is commendable that the Sri Lankan government has taken steps to reintroduce English medium instruction, it is a journey that has only just begun. The generation or more of teachers who have not received training in the English medium will first have to be addressed before Sri Lankans as a whole can engage meaningfully with science.

Sean Perera, a Sri Lankan national, is a researcher at the Centre for the Public Awareness of Science, the Australian National University, Canberra.

Anousheh Ansari to Give Conference Keynote

As the first female private space explorer, Anousheh Ansari knows how to create and enable change. In her keynote address at the 2009 ASTC Annual Conference on October 31, she will explore how science centers can encourage quick and effective social change. Ansari and her family helped to bring in a new era in private spaceflight when they sponsored the Ansari X Prize to encourage innovation in reusable spacecraft. In addition to chairing her own technology company, she works with global organizations like Ashoka, which supports social entrepreneurs working to bring about change in more than 60 countries.

ASTC 2009, entitled “The Art of Science: Creating a Better Future/El Arte de la Ciencia: Hacia un Futuro Mejor,” will be hosted by the Fort Worth Museum of Science and History, Texas, and will run from October 31 to November 3. In addition to the main themes of blending art and science and taking on key societal issues, the conference will address ways centers can persevere in challenging economic times. Development offerings will include sessions on securing federal funding and building corporate partnerships. There will also be a development luncheon, and a roundtable with officers from the National Science Foundation (NSF) Informal Science Education Program.

This year’s conference marks the 10th anniversary of the ASTC Diversity and Leadership Development Fellows Program. To celebrate the program and the more than 100 Fellows who have benefited from it, ASTC will host the “Fiesta after the Feast,” featuring dancing and a special retrospective. Past participants and supporters are invited to contribute photographs and thoughts; contact Laura Huentalu Miguats at luhradamigu@sastc.org. In addition, several conference sessions will address equity and diversity. An all-day preconference workshop, led by ASTC Dimensions authors Robert L. Russell and Malu Jimenez (see pages 12–13), will focus on expanding informal science education for U.S. Latinos. Also, ASTC Dimensions authors Carlos Plaza and Derly Gonzalez (see articles on pages 3–4 and 10) will participate in a session on bilingual learning places.

For dates, times, and details, consult the preliminary conference program at www.astc.org/conference/index.htm.

Science Engagement in Action

ASTC joined Heureka, the Finnish Science Centre, Vantaa, in organizing the international Science Engagement in Action seminar, held March 20 at Heureka and webcast live. Seven experts from outside the science center field debated the following questions: What are the most challenging issues facing humanity today and into the future? What is the role of science in helping to solve these challenges? What can science centers do to engage citizens in the debate and action needed?

The experts noted a wide array of challenges, ranging from population growth to the disparity in distribution of wealth to the lack of political will to implement solutions. They concluded that science centers can play a role by hosting forums and fostering a passion for science.

More information and a video of the presenters’ introductory remarks are available at www.heureka.fi/portal/englanti/20th_anniversary. A follow-up discussion—“Toronto, Helsinki: What’s Next?”—is being organized for the ASTC Annual Conference in Fort Worth.
Lights Out for Earth Hour

ASTC, in partnership with the World Wildlife Fund (WWF), rallied science centers and museums to support this year's Earth Hour on March 28. Earth Hour is a worldwide event where individuals, businesses, and even cities turn out lights for one hour at 8:30 p.m. local time to demonstrate that people can make an impact on global warming. According to WWF, 3,922 cities in 88 countries had 1 billion participants, up from 50 million in 2008.

ASTC and IGLO asked members to participate in this event not only by turning out their lights, but also by planning special activities related to climate change. The Ontario Science Centre, Toronto, Canada, offered visitors a free Star Party featuring climate change activities. At Maloka in Bogotá, Colombia, visitors learned about light pollution while making star observations after the lights went out. The Sciencenter, Ithaca, New York, created an Earth Hour Experiment Guidebook (www.scientcenter.org/earthhour/Earth_Hour_Guidebook.pdf) for visitors and students. For advice on how to build local support for Earth Hour 2010, contact Walter Staveloz, wstaveloz@astc.org.

Expanding ISE for Latinos Conference

Staff from ASTC and more than 20 ASTC-member institutions participated in the Expanding Informal Science Education for Latinos conference, March 26–29 in Albuquerque, New Mexico. (See pages 12–13.) Hosted by the Self Reliance Foundation and supported by NSF, the conference brought together a wide range of organizations dedicated to involving Latino youth and families in informal science education. The more than 100 attendees engaged in lively dialogue and shared strategies for improving current programming. They also began to seed ideas for new partnerships. Ten ASTC-member institutions participated in the conference poster session.

Cosmic Serpent: Bridging Native and Western Learning

The Cosmic Serpent project explores connections and commonalities between Native and Western science learning in museums. As a Cosmic Serpent partner, ASTC is working to foster and support science centers’ participation in a series of workshops and a culminating conference, which ASTC will host in 2011 with the Smithsonian’s National Museum of the American Indian (NMAI), Washington, D.C. The first of these workshops, held March 15–20 in Santa Fe, New Mexico, exposed museum representatives to programs illustrating the complementary relationship that can exist between indigenous lifeways and Western science. The Northwest and California workshops will be held August 23–28 (applications due July 13) and November 8–13 (applications due September 28), respectively. For the application and more detailed project information, visit the Cosmic Serpent web site, www.cosmicserpent.org.

Funded by NSF, the Cosmic Serpent project serves practitioners at 96 science centers, science museums, and tribal/cultural museums in eight states in the U.S. Southwest, West, and Northwest. The project is led by a partnership between the Indigenous Education Institute and the University of California Berkeley Space Sciences Laboratory, with project partners NMAI, ASTC, and Ideum.

Calendar

JULY


AUGUST


SEPTEMBER


12–17 AZA Annual Conference. Hosted by Oregon Zoo, Portland. Details: www.aza.org/AnnualConference


21–26 22nd Annual Theatre in Museums Workshop. Hosted by the Children’s Museum of Indianapolis. Details: Patricia Daily, 317/334-3819, patriciadi@childrensmuseum.org

OCTOBER


31– Nov. 3 ASTC Annual Conference. Hosted by Fort Worth Museum of Science and History, Texas. Details: www.astc.org/conference
Welcome to ASTC

The following new members were approved by ASTC’s Membership Committee in October 2008. Contact information is available in the About ASTC section of the ASTC web site, www.astc.org.

SCIENCE CENTER AND MUSEUM MEMBERS
• Dundee Science Centre, Scotland, United Kingdom. First opened in 2000 as a Millennium project funded by the U.K. National Lottery, this 19,000-square-foot center is popularly known as Sensation because its more than 80 hands-on exhibits are based on the five senses.
• Hanford Reach Interpretive Center, Richland, Washington. The $40.5 million interpretive center will be built on a 50-acre site at Columbia Point, the confluence of the Yakima and Columbia rivers. Set to open in 2011, the center will feature 15,000 square feet of permanent exhibition space, bicycle and walking trails, classrooms, and indoor and outdoor theaters.
• North Carolina Arboretum, Asheville. Located on a 434-acre site within the Pisgah National Forest, this affiliate institution of the University of North Carolina operates three-hour Segway tours along woodland trails. The 16,000-square-foot Baker Exhibit Center houses a greenhouse, information center, and temporary exhibition space.

SUSTAINING MEMBERS
• Alan Friedman Consulting, New York City
• Clifford Wagner Science Interactives, Inc., Philadelphia
• MediaMerge, Inc., Chelsea, Alabama
• Moser Productions, Inc., Richmond, Virginia
• Mystic Scenic Studios, Inc., Norwood, Massachusetts
• Push Product Design, LLC, Birmingham, Alabama
• Visual Sports Systems, Concord, Ontario, Canada.

MORE SPACE—On March 6, the 45,000-square-foot McAuliffe-Shepard Discovery Center opened in Concord, New Hampshire, quadrupling the size of the original Christa McAuliffe Planetarium. The expanded center incorporates the exhibits from the original 1990 building, while updating the planetarium and adding more exhibits and an observatory.

Named for two space pioneers from New Hampshire—Christa McAuliffe (1948–1986), selected as the first teacher in space, and Alan Shepard (1923–1998), the first U.S. citizen to journey into space—the center takes a local focus on space travel. It includes a tribute to its New Hampshire namesakes, as well as full-scale replicas of a Mercury-Redstone rocket and the Mercury 7 Capsule that took Shepard on his historic suborbital flight in 1961. Visitors can also get a local and personal perspective on space travel by examining actual items that astronauts from New England took with them to space.

Other exhibits focus on astronomy, Earth and space science, and technology. In Walk on the Sun, visitors can stand on different parts of a projected image of the sun and hear different sounds that indicate the brightness, color, and temperature of a particular area. In the exhibit gallery Looking at Earth—Looking Beyond, they can touch rocks and minerals found on Earth and other planets, or see the features of the planet or moon of their choice projected on a globe.

Future phases of the $15 million expansion will include an aviation wing, astrophysics exhibits, and a Challenger Learning Center. The center is funded by the National Aeronautics and Space Administration and the state of New Hampshire, with private support from BAE Systems, SkySkan, and Northeast Delta Dental.

Details: David McDonald, director of education, dmcdonald@starhop.com, www.starhop.com

ROCKY MOUNTAIN HIGH—How would your body respond to a hike to a 14,258-foot mountain summit? Visitors to Expedition Health at Colorado’s Denver Museum of Nature & Science experience a virtual climb up Mount Evans in the state’s Rocky Mountains, measuring the responses of their own unique bodies along the way. The 10,000-square-foot exhibition, which opened April 3, replaces the 20-year-old Hall of Life and is the museum’s first new permanent exhibition in six years.

To enhance the exhibition’s local focus, each visitor chooses one of 12 “expedition buddies”—a diverse group of real Colorados. They appear on video screens to explain how the body works and to share their experiences from an actual trek up Mount Evans.

As visitors travel through the Core Exhibition, they take measurements of their own bodies, hear messages from their buddies, and see human anatomical specimens. For example, they can measure their skin temperatures in and out of a “cold box,” hear their buddies talk about the wind chill they experienced on Mount Evans, and (for the brave of heart) see a frostbitten human toe. They can also compare their blood oxygen levels with that of a hiker ascending Mount Evans in a film at BodyTrek Theater, examine

Spotlights

By Emily Schuster

At Biology Base Camp in the exhibition Expedition Health, visitors can extract DNA from wheat germ or determine the sugar content of cereal. Photo by Scott Dresel-Martin
On April 21, the PNC Foundation announced Grow Up Great with Science, a three-year, $6 million initiative to foster a foundation in science for preschoolers. The foundation has awarded grants to 14 mid-Atlantic science centers and nonprofit organizations, including 10 ASTC members: the Academy of Natural Sciences, Philadelphia; Carnegie Science Center, Pittsburgh; Cincinnati Museum Center, Ohio; the Delaware Museum of Natural History, Wilmington; the EcoTarium (as part of the Worcester Collaborative), Massachusetts; the Franklin Institute, Philadelphia; Liberty Science Center, Jersey City, New Jersey; the Louisville Science Center, Kentucky; the Maryland Science Center, Baltimore; and Whittaker Center for Science and the Arts, Harrisburg, Pennsylvania.

The Institute of Museum and Library Services awarded $2,994,748 in Conservation Project Support grants on May 1. (All awards require matching funds.) Three ASTC members were among the 35 recipients:

- The American Museum of Natural History, New York City: $74,090 to conserve totem poles and large wood carvings housed in the Hall of Northwest Coast Indians
- The Milwaukee Public Museum, Wisconsin: $113,979 to preserve the Carl P. Dietz Typewriter and Business Machine Collection
- The Peabody Museum of Natural History, Yale University, New Haven, Connecticut: $149,282 to conserve and rehouse 7,600 specimens in the Vertebrate Paleontology Fossil Fish collection.

The Maryland Science Center, Baltimore, was awarded a $322,313 from the National Science Foundation (NSF) to host an exhibition of artwork by participants in NSF’s Antarctic Artists and Writers Project, as well as science demonstrations related to the exhibition.

NSF awarded $68,883 to the American Museum of Natural History, New York City, to produce a short documentary film and public program about taxonomic and biodiversity research of fauna in the lower Congo River.

Citi Foundation contributed a $40,000 grant to Hands On! Regional Museum, Johnson City, Tennessee, to teach financial literacy in local youth programs, as well as in programs in the museum’s Kids Bank & Credit Union exhibition.

The Women in Natural Sciences (WINs) program at the Academy of Natural Sciences, Philadelphia, received a $25,000 grant through clothing company Eileen Fisher’s Self Image Grant Program for Women and Girls.

Idea, Corrales, New Mexico, received a New Mexico Technology Solution Award from the New Mexico Technology Council. The company was honored for its “MT2 Multitouch, Multiuser Table”
After 10 years of service, Moshe Rishpon stepped down as director of the Clore Garden of Science, Weizmann Institute of Science, Rehovot, Israel, on March 1. In 1999, Rishpon received ASTC’s Award for Innovation for his work creating the Clore Garden. He is succeeded by Zvi Paltiel, a physicist and former director of Weizmann Institute’s Young@Science program.

Troy A. Thrash became executive director and CEO of the Da Vinci Science Center, Allentown, Pennsylvania, on March 30. Thrash was previously executive director of the National Aerospace Development Center in Alpharetta, Georgia. He succeeds Frank K. Schweighardt, who had served as interim CEO since August 2008.

The Science Center of Iowa, Des Moines, has chosen Paul Jennings as its new president and CEO. Jennings is formerly chief executive of Dundee Science Centre, Scotland, United Kingdom, and is a member of the first cohort of Noyce Leadership Fellows. He succeeds Mary Sellers, who served in the position for nine years.

Lowell Observatory, Flagstaff, Arizona, named Eileen Friel as its new director on June 15. Friel was formerly the executive officer for the Division of Astronomical Sciences at the National Science Foundation. She succeeds Bob Millis, who stepped down after heading the observatory for 20 years.

On June 30, Mike Sullivan retired as executive director of Gulf Coast Exploreum Science Center, Mobile, Alabama. Sullivan led the Exploreum during its first 11 years in its downtown location. Prior to becoming executive director, he spent eight years working with the Exploreum as a consultant. A national search for his replacement is underway.

The Science Museum of Minnesota, St. Paul, has chosen Jill Rudnitski to be its vice president of development. In a career spanning more than 20 years, Rudnitski has worked in fund-raising at the St. Cloud State University, Minnesota, and the University of Minnesota.

The Franklin Institute, Philadelphia, has selected Troy M. Collins as senior vice president of programs, marketing, and business development. Most recently, Collins served as president and CEO of the Battleship New Jersey Museum and Memorial in Camden.

Mark Hogan is the new vice president of technology at Mad Systems, an audiovisual systems integration company in Orange, California. He had previously spent 18 years working within development and systems groups at Electrosonic.

At its 2008 Equity Awards Dinner, the Educational Equity Center at the Academy for Educational Development (AED) honored Maritza B. Macdonald, director of education and policy at the American Museum of Natural History, New York City, as one of three Equity Champions.

Adrian Van Allen, multimedia designer and exhibit developer at San Francisco’s Exploratorium, was among the winners of the Rome Prize in design. Van Allen will study and work in Rome in March 2010, creating an interactive map that lets visitors explore the evolution of the sciences in Rome.