The work that inspires us: Collaborating with Underserved Audiences

NISE network
NANOSCALE INFORMAL SCIENCE EDUCATION

JUNE 2015
NETWORK-WIDE MEETING

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NSF

The work that inspires us: Collaborating with underserved audiences

- **Marilyn Johnson, OMSI**
- **BethBockoven, Hands On! – A Children's Gallery,**
- **Andrew Redline, North Museum of Nature and Science**
- **Denise LeBlanc, Discovery Museum**
- **Alex Eiler, Pink Palace**
- **Sarah Zimmerman, Port Discovery**

Our Themes for the session:

1. **Leveraging NISEnet resources to transform practice and reach new audiences**

2. **Using NISE resources to better serve audiences with differences in sensory awareness**

3. **Incorporating NISE resources to enrich ongoing programs serving wide audiences**

Sarah Zimmerman
Port Discovery

Nano with Blind Audiences

- On November 8th, 2014 Port Discovery held a STEM camp with the National Federation of the Blind.
- The camp was made possible through funding from NSF.
- 20 children grades 3rd-5th and their parents plus 10 high school counselors participated in the camp.
- STEM sessions included: Nanoscience Exposed and Everyday Engineers.

Nano with Blind Audiences

Activities:

- Exploring Size: Tiny Ruler
- Exploring Properties: Surface Area
- Scavenger Hunt in Nano mini-exhibition

Nano with Blind Audiences

Challenge:

- Make primarily visual activities engaging for blind children?

Solution!:

- Make them accessible via other senses!
- Surface Area- listened to the reaction
- Tiny Ruler to feel and imagine how small a nanometer is.
- Utilize Braille text.

Nano with Blind Audiences

Lessons Learned:

- Most activities don't need much modification
- Simple changes: provide models, add braille, keep it tactile.
- It takes longer!

Next Steps:

- Funding to collaborate with NFB or Maryland School for the Blind with Nano/STEM camps

Serving Economically Challenged Communities

The Schools We Serve:

- Title I schools primarily in Baltimore City.
- Some Title I schools in Baltimore County and surrounding counties.

The Students (Baltimore City):

- Over 45,000 Elementary School Students
- 83% African American, 7% Hispanic
- 84% Low Income

Serving Economically Challenged Communities

Collaborations:

- Child First Authority
- Parks and People Foundation
- Y of Central Maryland
- Maryland Out of School Time Network

Funding:

- Weinberg Foundation
- Thalheimer Foundation
- Corporate Sponsors

Serving Economically Challenged Communities

Our Program:

- Five 1 hour sessions
- “Alice in Nanoland” theater program with New Moon Children’s Theater.
- 4 sessions based on rules of “Nanoland” using NanoDay kit, adapted and new activities.

Our Reach (since fall 2012):

- 5 Organizations
- 25+ Schools
- 2,500+ Students

Serving Economically Challenged Communities

Key = Taking Programs on the Road

- With budget cuts to schools and programs, transportation has become too expensive
- Adaptation: bring program to site!
- Little to no extra expense to you!
- Our Numbers:
  - Fall 2012 after school at the museum=100 children
  - Spring 2013 after school at the sites= 350 children
  - Now reach 800 children per year with after school programs

The Work that Inspires Us: Collaborating with Underserved Communities

The Role of Nano Science Programs in Transforming a Museum's Approaches to New Audiences

Andrew D. Redline

Curator of Collections

North Museum of Nature and Science

Lancaster, PA

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Old Ways

As late as the mid-2000s (and even later), the North Museum was offering traditional lectures, regimented docent tours, and fact-centered educational programs and exhibits

Programs were topic-centered and devised on static displays and one-way conversations

User base was declining as children and parents "aged out" of participation, new families and underserved audiences were practically unaware of the museum

Under-served audience engagement was practically non-existent with the exception of free or discounted admission programs

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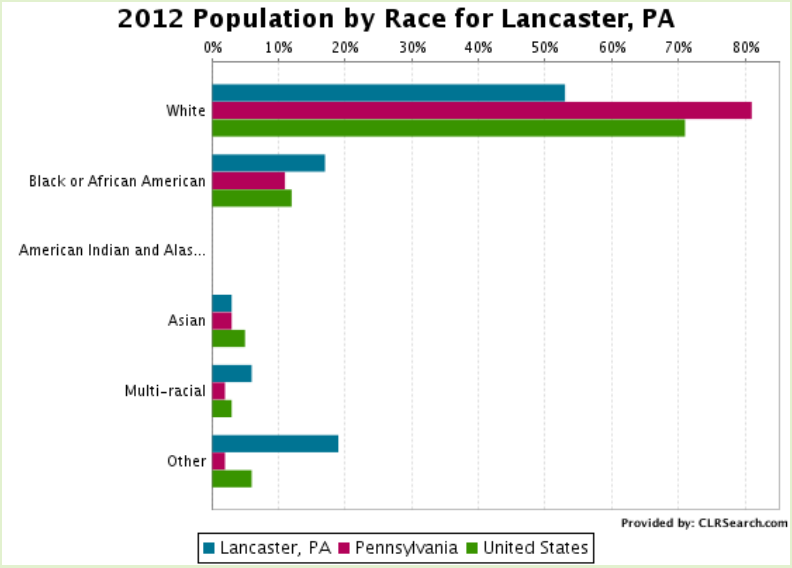
Challenges



Differing from the county of Lancaster, the city of Lancaster has considerable diversity of race and cultural identity – and it's growing rapidly

Almost 40% of the city population identifies as Hispanic, the city of Lancaster also has the highest percentage of people of Puerto Rican affinity in Pennsylvania

Additionally, like any area of the country, people with special needs require services

Beginnings

nano NORTH

Beginning just before the first set of Nano Kits, the museum set up traditional camps – providing rich experiences but limited underserved audience participation

The museum used the Nano Mini Exhibit as a highlight of a small satellite location used during renovations – even dubbing it "Nano North"

As staff and volunteers used the Nano Kits, they realized that they were more experiential and question-based and also began to understand the Nano Mini Exhibit was not formatted for "this is this and that is that" presentations

Staff also realized that they knew little more than the users about nano science, leading to "learning together" and concentrating on real-world applications – this could then be further applied to people not as familiar with museum styles including many underserved audiences

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Transforming Styles of Engagement

The museum now has the tools for more effectively engaging diverse and underserved audiences

The museum is now learning along with the new audiences it is serving – this applies to science content , real-world application of science, and understanding more diverse learning styles – this provides a freshness and personality that is more appealing and has greater potential

The Nano Mini Exhibit has become one of the most engaging exhibits in the renovated museum, commanding dwell-time well-beyond that of a temporary dinosaur exhibit

The museum has had some luck training youth to use Nano Kits – effectively bridging barriers and old perceptions of the need for a "lecture from an adult"

Examples

- **“Nano Flash Mob” in city locations**
- **Program at urban John Price Elementary School, “National Night Out”**
- **Spanish language broadcast on local radio/television**
- **Convincing and training high school students to deliver nano programs (via Nano Kits) at a local high school and event, establishing “Nano Kit Lending Library”**
- **Using Nano Kits at on-site events beyond “Nano Days”**

Next Steps

True **collaboration (adapting programs to meet audience needs rather than assuming the museum can anticipate these needs – "serving" is *not* collaboration)**

Adapting lessons learned to the *entire scope* of museum programs (how to engage is as important as what the topic of engagement is)

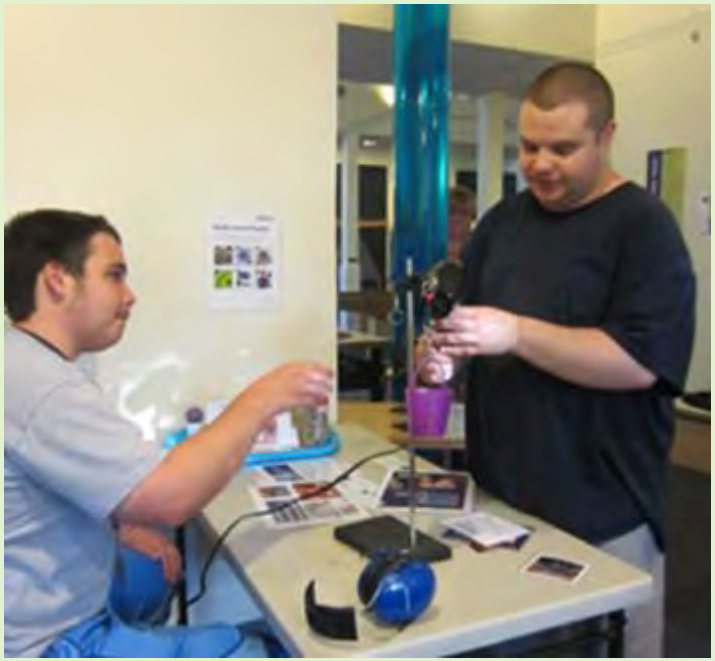
Continuing to examine relevant *connections for hard-to-visualize science* (this applies for theoretical and statistical science as well) and push for more *experience* (as opposed to content)

Beyond the NISE Network, the styles that nano programs have fostered are vital for the health of the North Museum and its integration into the community it serves

Denise LeBlanc
Discovery Museums

Universal Design adaptations for Nano Kits

presented at Free Friday Nights and Especially for Me! events



The Discovery Museums' supports innovative hands-on learning and meaningful play experiences for all. Through Free Friday Nights, Especially for Me!, and reduced admission we strive to provide opportunities for those who face a variety of barriers---financial, developmental, or cultural---to experience the Museums.

Themed Free Friday Nights

NanoDays@Night
Free evenings led by teens

UD Nano Fabric

Modifications

- Fewer words, symbols, larger font
- Fabric on hoops; extra fabrics to dip
- Water repellent surfaces on slate and wood
- Larger squeeze bottle; ability to dip

hydrophobic

hydrophilic

UD Memory Metal

Holder with different color coded labels for nitinol and steel springs.
Memory wire for additional experimenting.
Headphones for noise reduction if using hair dryer.
Hot water in familiar container to heat the memory wire.

UD Ferrofluid

Can a liquid be magnetic?

Hold the magnets beside the Different test tubes.

What do you notice?

Handles for magnets
Holder for tubes with added contrast
Larger text, pictorial signs
Tactile models and descriptors

Universal Design applied to Nano Kits

Adaptations were made to Nano Kits to increase sensory, physical, and cognitive access. These modifications were developed and prototyped with visitors and benefit all audiences.

- Communicate that Nano is a measurement
- Use less text and larger fonts
- Layer content and information – more detail offered as needed
- Use photos, universal symbols, color coding
- Modify choke hazards, and breakable or fragile objects
- Create handles and holders to make grasping and manipulating easier
- Increase contrast on signs and materials
  - white background for magnetic filings, ferrofluid; lightbox for DNA
- Add tactile models and descriptive words
- Provide sensory filters and options
  - headphones for noise, opportunities for multiple interactions
- Provide notepad for communication – questions, words, sketches
- Staff training

Alex Eilers
Pink Palace

Nano: Gateway to New Audiences

Nano created two opportunities to reach new audiences:

- Summer Suitcase Lend-out
  - Boys and Girls Clubs
  - Library Summer programs
- Science Nights
  - PACE (Parent and Community Engagement) – included underserved students in MCS and SCS
  - Girl/Boy Scouts
  - Students with autism
  - Adults with disabilities

Sensory Awareness and Autism

Before our Autism Science Night:

- Preparation for our event
  - Met with Autism Society of the Mid-South
  - Demoed each activity with a child with autism
  - Selected interpreter-led and self-guided activities
- What we learned:
  - Highly visual and tactile activities
  - Self-guided activities less popular
  - Activities with no noise
  - Turned off our robotic dinosaur
  - Created Quiet corners

Favorite Nano Activities

From our test with a child with Autism, here are the favorite activities:

- Exploring Measurement and Special Microscopes (really worked well paired together)
- Kinetic Sand
- Invisibility
- Ferrofluid (need a bigger magnet for those with impaired fine motor skills)
- Nano fabric
- Dress like a Nano Scientist

Beth Bockoven

Nano Science at Mission Children's Hospital

A Child's Gallery Hands On! handsonwnc.org

- 7 1/2 years old
- 5600 square feet
- 29,000 visitors per year
- NISE network member since 2011
- Traveling science program since 2011

MISSION Children's Hospital

Only children's hospital in western North Carolina averaging 3,000 patient admission per year.

Nano Science at Mission Children's Hospital

- **GOAL #3: Establish Hands On! as an educational force utilized throughout our region.**
  - **Build relationships and collaborations with partners.**
  - **Be a creative resource in the community to educate children in venues outside our facility.**

- **NISE network mini-grant allowed Hands On! to partner with Mission Children's Hospital.**

Nano Science at Mission Children's Hospital

Goals:

- Serve an underserved population of children ages 3-12 staying at in-patient unit from varied socioeconomic backgrounds coping with injuries, acute illness & chronic illness.
- Add Nano science to the current arts-only programming.
- Introduce children to science professionals.
- Provide fun & education during a time of fear & anxiety.

Nano Science at Mission Children's Hospital

Hands On! educators Dr. Bunson & Dr. Beaker visit the pediatric unit once a month.

- 45 minute programs in play rooms.
- Take carts into individual patients rooms.
- Scheduled 9 Nano

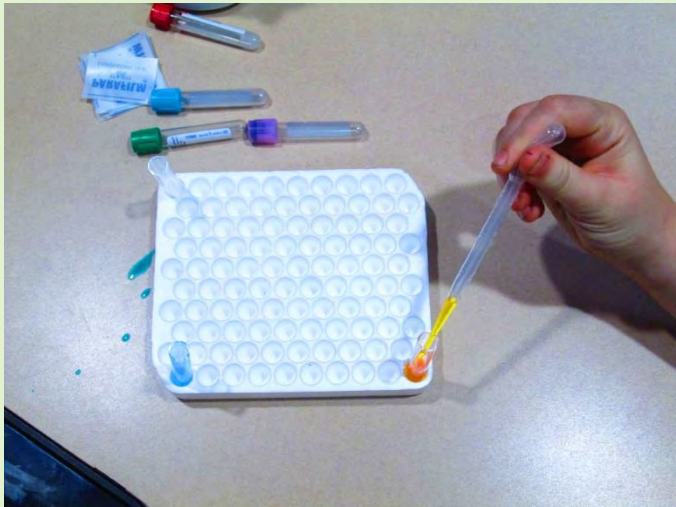
Programs with

corresponding hospital professional.

Nano Science at Mission Children's Hospital

Exploring Size & Tools + Hematology:

- Powers of 10
- Mystery Shapes
- Transmission Electron Microscope
- Ready, Set, Fizz!



Nano Science at Mission Children's Hospital

Exploring Size & Tools + Hematology:

- Powers of 10
- Mystery Shapes
- Transmission Electron Microscope
- Ready, Set, Fizz!

Nano Science at Mission Children's Hospital

Exploring Materials + Orthopedic:

- Nano Size Poster
- Oobleck
- Liquid Body Armor

"Holmes was excited to get out of his room and have a cool learning experience. It will be a fond memory from the hospital. This will make future visits to the hospital not so scary! The Dr.s were fun and nice." ~ Holmes' mother

Nano Science at Mission Children's Hospital

Participants at a glance:

- 17 girls / 5 boys
- 22 children / 17 adults
- Ages 5-15

CHALLENGES:

- Putting on protective clothing for working in some of the patients rooms.
- Sometimes only having one patient that can attend the program.
- Scheduling hospital professionals who have to cancel due to emergencies & general day-to-day hospital issues.
- Moving from set-up in play room to individual rooms. Having two educators really helped make this move efficient.

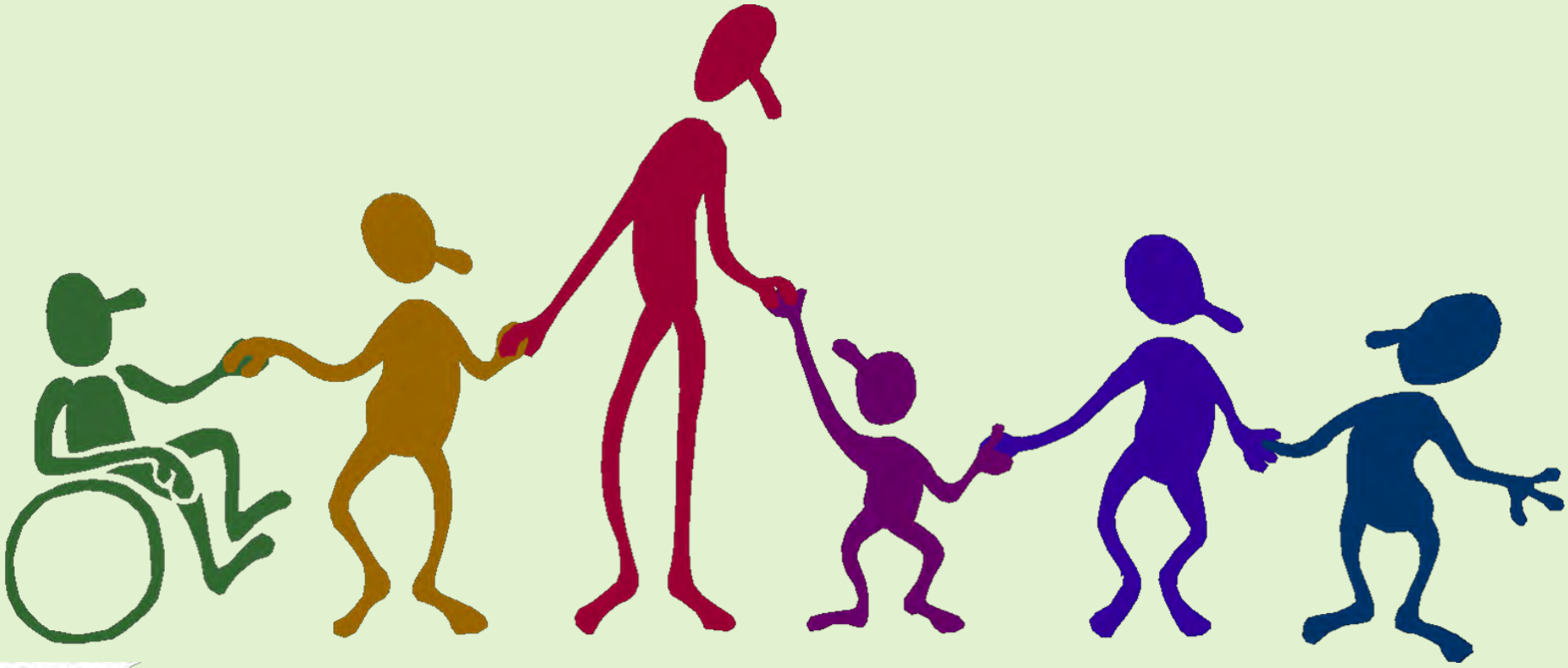
Nano Science at Mission Children's Hospital

OPPORTUNITIES:

- Work with small groups & even one on one – an educators dream!
- Teach children and their family members together; both interacting & learning from each other.
- Learn about the amazing professionals who work in a pediatric unit.
- Watch patients & care-givers making connections with the Nano science program and their care in the hospital.
- Provide resources for patients that extends beyond the program.

Questions & Discussion

Thank you!



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