

NISE Net Mini-Exhibition Scope and Goals

January 25, 2012

IMPACT

Public engagement

- Reach tens of millions of visitors during life of exhibition copies
- Create an environment that encourages engagement and learning for a broad public audience (see below)
- Complements other nano learning experiences including NanoDays

Professional capacity-building

- Promote ability of host museums to engage the public in nano
- Create a physical presence for nano at host museums, encouraging ongoing nano educational efforts (including programming)
- Create a model for simple, replicable, inexpensive mini-exhibitions that can be distributed widely

SCOPE

- Size: 400 square feet
- Description: Multiple interactive hands-on components and seating area
- Cost: ~\$30k/copy for 50 copies
- Distribution: ~50 science and children's museums in the United States
- Agreement: Host museums display the entire exhibition (together) for a minimum of one year; host museums own and maintain

DESIGN

- Overall design
 - Welcoming and comfortable look and feel
 - Clean, appealing design that fits into many museum environments
 - Environmental elements create an immersive, unified experience
- Exhibition elements (interactive components, signage, seating area, audio description, and reading materials)
 - Exhibition communicates key concepts through hands-on experiences, attractive images, and concise text
 - Key concepts and messages are relatively easy to understand and are reinforced and repeated throughout the exhibition
 - Layered experiences allow visitors to learn and explore in various ways and at various depths (includes interactives, signage, and seating area with reading materials)
 - Exhibition content makes connections to visitors' everyday life
 - Interactives are easy-to use, fun, hands-on, and invite long dwell times
 - Interactives encourage social interaction among visitors
 - Exhibition features "real things": phenomena (e.g. butterfly, scent), materials (e.g. ferrofluid), magnified microscale and nanoscale images
- Maintenance
 - Durable materials

- Low-tech components
- Minimal maintenance
- Minimal consumables
- Accessibility
 - Universal Design approach
 - Bilingual English-Spanish

AUDIENCE

- Visitors to science and children’s museums
- Core public audience is families with children ages 6-12

EXHIBITION COMPONENTS

What happens when things get smaller?

Vertical panel + attached table with flips

- “What happens when things get smaller?”
- “How can tiny technologies help us solve big problems?”

Interactive exhibits

- *Small, Smaller, Nano*: visitors explore progressively smaller magnetic materials — magnetite sand, iron powder, and ferrofluid.
- *Static vs. Gravity*: visitors spin disks containing small and large plastic beads, comparing the relative effects of static electricity and gravity on different size beads.

What’s new about nano?

Vertical panel + attached table with flips

- “What’s new about nano?”
- “Can nature inspire nanotechnology?”

Interactive exhibit

- *Build a Giant Carbon Nanotube*: visitors work together to build a giant model of a carbon nanotube.

Where can you find nano?

Vertical panel + attached table with flips

- “Where can you find nano?”

Interactive exhibit

- *I Spy Nano*: visitors try a series of interactive challenges, then search a complex image for examples of real nano products and phenomena

What does nano mean for us?

Vertical panel + attached table with flips

- “What does nano mean for us?”
- “What does nanotechnology mean to you?”

Interactive exhibit

- *Balance our Nano Future*: visitors balance blocks on a tippy table, which represents the challenge of working together to build a stable nano future.

Seating and reading area

Sofa and armchair

- Gecko and butterfly puppets

Table with reading materials

- Reading boards
 - How small is nano?
 - Try measuring in nanometers!
 - What is stuff made of?
 - How do we study and make nanotechnology?
 - How is nano inspired by nature?
 - What’s surprising about nano materials?
 - Will nano change my life?
 - Will nano change the world?
- Audio description
 - *Nano* exhibition overview
 - *Small, Smaller, Nano*
 - *Static vs. Gravity*
 - “What happens when things get smaller?”
 - *Build a Giant Carbon Nanotube*
 - “What’s new about nano?”
 - “Where can you find nano?”
 - *Balance Our Nano Future*
 - “What does nano mean for us?”
- Trade books

VISITOR LEARNING OBJECTIVES

Strands of learning (National Research Council 2009)

1. **Developing interest in science:** Motivation, curiosity, and enthusiasm to learn science over time
 - The exhibition supports this strand of learning by creating a fun, comfortable environment for learning for visitors of all ages
2. **Understanding science knowledge:** Understanding the natural world
 - The exhibition supports this strand of learning by communicating a limited number of content messages appropriate for the core public audience; these are outlined below.
3. **Engaging in scientific reasoning:** Asking and answering questions and evaluating evidence

- The exhibition contributes to this strand in a limited way by posing questions on the signage (banners and reading rails) that visitors can explore throughout the exhibition.
4. **Reflecting on science:** Science as a way of knowing
 - The exhibition does not address this strand of learning.
 5. **Engaging in scientific practice:** Interacting with others to explore a problem or phenomenon
 - The exhibition contributes to this strand in a limited way by creating a social learning environment with layered experiences that allow individual members of visiting groups to participate in different and appropriate ways.
 6. **Identifying with the scientific enterprise:** Being comfortable with, knowledgeable about, and interested in science
 - The exhibition supports this strand of learning by creating a welcoming environment with easy-to-use interactives and content that relates to visitors' every day lives.

Main content messages of exhibition

Content messages for the exhibition

1. Materials can act differently when they're nano-sized. (CONTENT MAP IDEA 1)
2. Nanotechnology lets us build things the way nature does—atom by atom. (CONTENT MAP IDEA 2)
3. Nano is all around us, in nature and in technology. (CONTENT MAP IDEAS 2-3)
4. Nanotechnology will affect our economy, environment, and personal lives. (CONTENT MAP IDEAS 3-4)

Content messages by components

What happens when things get smaller? *Small, Smaller, Nano; Static vs. Gravity*

Primary

- Materials can act differently when they're nano-sized. (*Examples: magnetite, gold, plastic beads.*)

Secondary

- Scientists are learning to take advantage of nano properties to create new materials and technologies. (*Examples: cancer treatments, food products, thin film solar cells, and water filters.*)
- Nanotechnologies can help us solve big problems. (*Examples: energy, medicine, water, food.*)

What's new about nano? *Build a Giant Carbon Nanotube*

Primary

- Nanotechnology lets us build things the way nature does—atom by atom.

Secondary

- To make different materials, atoms combine in different ways. (*Examples: diamond, graphite, CNTs.*)

- Nature can inspire nanotechnology. (*Examples: lotus/fabric, gecko/robot, snowflake/chip, butterfly/display.*)

Where can you find nano? I Spy Nano

Primary

- Nano is all around us, in nature and in nanotechnology. (*Examples from nature and consumer products: butterfly, orange/things that smell, electronics, toys.*)

What does nano mean for us? Balance Our Nano Future

Primary

- Nanotechnology will affect our economy, environment, and personal lives.

Secondary

- To create a stable nano future, we'll need to balance costs, risks, and benefits. (*Examples: environment, medicine, water/world aid, food/investing.*)
- Individuals, companies, and governments help shape our nano future.

EXHIBITION GOALS & COMPONENTS

	Sustained use	Engaging	Social interaction	Broad age range	Further exploration	Nano awareness and understanding			
						1. small & different	2. studying & making	3. new technologies	4. nano & society
ENTIRE EXHIBITION	X	X	X	X	X	X	X	X	X
What happens when things get smaller?									
Panel + table "What happens when things get smaller?"					X	X		x	
Interactive <i>Small, Smaller, Nano</i>	X	X	X	X		X			
Interactive <i>Static vs. Gravity</i>				X		X			
What's new about nano?									
Panel + table "What's new about nano?"					X		X	x	
Interactive <i>Build a Giant Carbon Nanotube</i>	X	X	X	X			X		
Where can you find nano?									
Panel + interactives "Where can you find nano?" + <i>I Spy Nano</i>		X	X	X	X	x		X	x
What does nano mean for us?									
Panel + table "What does nano mean for us?"					X			x	X
Interactive <i>Balance Our Nano Future</i>	X	X	X	X					X
Reading and seating area									

KEY TO TABLE

Sustained use (visitors stay in the exhibit a long time; some will make repeat visits)

Engaging (visitors find the exhibit fun and interesting)

Social interaction (visitors work together and talk about their experience)

Broad age range (all ages are present and use the exhibition; different ages tend to use different parts)

Further exploration (some visitors use materials such as panels, flips, and reading boards)

Nano awareness and understanding (visitors have a greater awareness and understanding of nano, as defined in the NISE Net content map)

1. Small and different: Nano is small and different.
 - Exhibition message: “Materials can act differently when they’re nano-sized.”
2. Studying and making: Nano is studying and making tiny things.
 - Exhibition message: “Nanotechnology lets us build things the way nature does—atom by atom.”
 - “Exhibition message: Nano is all around us, in nature and in technology.”
3. New technologies: “Nano is new technologies”
 - Exhibition message: “Nanotechnology will affect our economy, environment, and personal lives.”
4. Nano and society: “Nano is part of our society and our future.”
 - Exhibition message: “Nanotechnology will affect our economy, environment, and personal lives.”