



# NISE Mini Exhibition

Formative Evaluation Overview

By Marjorie Bequette & Scott Van Cleave

*January and March, 2011*

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### THIS IS A FORMATIVE EVALUATION REPORT

Formative evaluation studies like this one often:

- **are conducted quickly**, which may mean
  - small sample sizes
  - expedited analyses
  - brief reports
- **look at an earlier version** of the exhibit/program, which may mean
  - a focus on problems and solutions, rather than successes
  - a change in form or title of the final exhibit/program

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## Overview

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During the winter of 2011, SMM survey associates and NISE Exhibits Team members collected a range of data on the mini-exhibition on the floor at SMM. This included interviews with visitors in January, and observations in January and March. The detailed reports on this work on these follow this summary.

Overall, the formative evaluation on the mini-exhibition was promising. The mini-exhibition was consistently popular, with family groups entering, engaging, and in some cases returning to the space. Children, in particular, enjoyed playing with the interactive elements, especially Small, Smaller, Nano, but also including the construction activity (Build a Carbon Nanotube) and the Tippy Table. The seating areas were used for relaxation, and the I Spy was engaging for some visitors.

Areas of focus for improvement during this analysis included:

- The Tippy Table – text changed, and additional blocks tried.
- Instructional text for several elements changed.
- Reading rails with flip doors added.
- Images and text on the banners were changed.

We did minimal investigation into the kinds of ideas that visitors develop, but that brief investigation (and informal observations) suggest that people are engaging somewhat with ideas about nano during their time in the exhibition; further evaluation and/or research will probe that topic. There were no red flags that made us worried or feel like we had to put lots of effort into that question at this time. Visitors use the word “nano” in talking with each other or in describing the main point; they discuss size; in some cases they discuss the importance of nano particles or of planning for a nano future.

The mini-exhibition includes Spanish translations; visitors seem to appreciate their presence, but further investigation in settings with a larger Spanish-speaking visitorship will uncover more information about this effort. The team is continuing to collect information about accessibility issues and will, as possible, alter or enhance the exhibition accordingly.

# NISE Mini Exhibition Interviews

## Approach

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We conducted 17 interviews over two days with visitors ranging in age from nine to 44; with ten females and seven males; with five children and thirteen adults (one interview was with an adult but a couple of questions were directed to the child within the group); with at least ten SMM members; and with 14 whites, 1 African American, 1 Asian and 1 Hispanic/Native American. Visitors were observed without contact then approached after leaving the exhibit area. The interview form had nine questions grouped into four sections: Interest and Enjoyment, Impressions, Content and Translations. Visitors were asked only one question from each section. Interviewers alternated questions between interviews.

## Interview Sections

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### Interest and Enjoyment

- Three visitors were attracted to the mini exhibit area because it was **new**, two others because it was **hands-on**, and two others just **followed their kids** with one adult remarking how their child “liked the tables being at his height.”
- Four visitors (3 kids, 1 adult) said **Small, Smaller, Nano** was their favorite part, and one child really liked the **Tippy Table**, while one adult and one child identified the **hands on** aspect remarking specifically about being able “to build stuff.”

### Impressions

- Asked to describe or talk about the mini-exhibits, five visitors talked about **magnets**, four described it as **hands on/interactive**, three referred to some aspect of **size**, and three others mentioned **nano**.
- Two visitors using nano used the term “**nanos**” without a specific noun nano might modify—“*It had nanos and magnets.*” “*A description of nanos, what they are.*”
- One nine year used nanometer saying it’s “*About how the bigger the number is in the nanometer, the bigger the iron is, and about all the nano stuff.*”

### Content

- Six visitors made reference to **nano** when asked what the main point of the space was. Three visitors referenced **size**, and two others related nano to **everyday** items.
- One 15 year old gave a most compelling answer: “There are things you can’t see which are still as important.”

- Asked what they thought “nano” was, most visitors referred to **size**. In reference to size, four visitors talked about nano being **small**; however, two related more significance in being small—“*Small things have structure.*” “*How small particles can make up larger structures.*”

## Translations

- All but one visitor interviewed noticed the Spanish translations.
- Most visitors thought the translations were positive, and a few visitors were enthusiastic about offering translations like this with two visitors mentioning other possible languages including Somali and Hmong.
- Two visitors, although not bothered by the actual translations, found them either busy or distracting.

## Interview Questions and Visitor Answers

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The number in parenthesis at the end of each answer is the age of the visitor.

### Interest and Enjoyment

#### ***Q1: Why did you decide to come over to this place?***

- Saw it was new. (12)
- Looked interesting, something new. (36)
- My son saw it and went in. I followed. (41)
- Looked fun. [No other reason.] (9)
- Hands-on, for kids to play on. (41)
- Mainly the kids thought it would be next. They liked it. (43)
- It's new. We have read about nanotechnology. He [6-year old son] is very interested in it. (40)
- Because it was more hands on, and I'm just following them. I think he (7) liked the tables being at his height. (38)
- I just followed dad. (9) [Dad said it was just at the bottom of the stairs and a natural progression to go there.]

#### ***Q2: Do you think you will try this exhibit again during a future visit to the museum? Why?***

- Probably. Wouldn't seek it out, but we see everything. (26)
- Yes. I didn't get a chance to see it all. (38)
- Yes, because I like it. It was interesting. (44)

#### ***Q3: What was your favorite part of this space?***

- Small, Smaller, Nano. It looked cool. I did all of them. (15)
- Ability to use, hands on. (40)
- The one with the oil and pieces of iron shavings. Favorite of those three little spaces, cool how it makes little peaks. (9)
- The black stuff. That's all we did. [Small, Smaller, Nano] (40)

- [I asked to the 7-yr old.] The Tippy Table! [Why?] Because we had to build stuff. [He was very enthusiastic about it. They built the whole scene twice with it falling apart once.]
- The moving things, things under the globe. It's fun and weird. (9)

## Impressions

### ***Q4: How would you describe this area to a friend?***

- Interesting and hands on. Facts plus see what happens. (15)
- Would tell them about magnets that move piles around. (Dad prompted them to tell more.) It's cool. (12)
- Has to do with magnets and size. (36)
- Kid friendly. Can build and touch and learn by doing. (40)
- It had nanos and magnets. My seven year old likes it. (41)
- We got to learn about what happened as things got small. (38)
- I used magnets to move them around to make different things move, made bubbles. [Learned about] how something reacts to magnets. (9)
- No clue. [Gave multiple prompts with same reply.] (41)
- A description of nanos, what they are. (44)
- It's interactive, fun. It can be for kids or adults. (43)
- [I asked to the 7-yr old, with no answer. Prompted with "Was it boring?"] No, it was fun! [Then child and brother left to go back to the Tippy Table to play with it some more.]
- It kind of moves, you put the thing under it. (9)

### ***Q5: Is there any part of this that you'd like to tell someone about? What would you tell them?***

- I don't know. Probably not. Didn't go to see all of it. (26)
- About how the bigger the number is in the nanometer, the bigger the iron is, and about all the nano stuff. (9)
- Working with the display [Small, Smaller, Nano] and the balancing thing. (30)
- It was neat to manipulate the particles. (40)
- I like the hands on stuff. He liked the magnets. (40)

## Content

### ***Q6: What do you think the main point of this space is?***

- There are things you can't see which are still as important. (15)
- About nano particles. [What is nano?] Little pieces of matter. [Did you read much?] Just a little reading. Read on iSpy to know what they [objects] were there for. (12)
- Learn about how iron can repel and attract, and learn about nanometers. (9)
- My son watched a NOVA special about nano, but I didn't know. I wasn't paying much attention. (41)
- Nano technology is all around. We played with the neighborhood mainly, but also the Small, Smaller, Nano. (38)
- Trying to provide a deeper look into things we don't normally look at. [What?] In terms of the shoes, and the structure, and showing the balance of the neighborhood. You don't normally see it from the top. (30)

- It's something about the properties of nano in stuff that you use everyday. (41)
- Teaching little kids what a nano is. I think little kids are the target. Adults know this stuff already. (44)
- Learning about magnets and how gravity works. (40)
- Letting folks know, both in nature and applied, we're learning from that, and we're making things smaller. (42)

**Q7: After visiting this area, what do you think “nano” is?**

- Didn't read information, guessing has to do with size, and that nano is small. (36)
- I don't know. Showing how small things look when you magnify them. Small things have structure. (26)
- Small. (40)
- [After much thought] Nano is like technology. (9)
- Don't know. I didn't have time to read it. (40)
- Very small. [How small?] Microscopic. (43)
- [I asked 6-year old child.] Little. [He said as he got on the floor and curled up into a ball.]
- How small particles can make up larger structures. (38)

## **Translations**

**Q8: Did you notice the Spanish language translations? What did you think of having those there? (Do they notice that these are unusual at SMM?)**

- Noticed it. Liked it. And she thinks it is good to have on a day when a lot of Spanish speakers are coming in. (15)
- Noticed Spanish. It's good for people who just speak Spanish. (12)
- Helpful for... (36)
- Yes. I don't care. (26)
- Yes. No opinions. Little distracting but not bothersome. (40)
- Yes. Couldn't understand them. Noticed how the exclamation mark is at the beginning and end. (9)
- Yes, it's nice. I've lived all over the world, so it is nice to see more sensitivity here in the U.S. (41)
- Yes. I like that. It's good for my kids to be exposed to different languages. (38)
- Yes. [No opinion] (9)
- Yes, good, lets kids know that Spanish is part of the language. They can see different words for the things they know in the neighborhood. (30)
- I did. It's fine. (41)
- No. (40)
- Yes, that's good. (44)
- Yes. Nice exhibit. Could be used by Spanish or English speakers. (43)
- Yes. I think they're great. Good if you added Somalie and Hmong for around here. (40)
- Yes. You see it all the time now. On cash machines and other places. I think they're good. Everyone should have a chance to enjoy and to learn. It was a lot of writing. Maybe if you had bullet points. (38)
- I did. I think it's great. Obviously, the Latino community is a big one in the Twin Cities, and they could use it. Might have to do others too, like Hmong. (42)



***Q9: Do you speak Spanish at home?***

- No. (12 cases)
- Studying it at school now. (15)
- No. But it is on my list of things to learn. (26)
- No, but we do stuff with different languages. (38)
- No, but we learn a little in school. (9)

## **NISE Mini Exhibition Formative Observations**

### **Protocol**

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On 1/29 and 1/30, 2011, SMM staff observed 23 groups of visitors at the NISE Mini Exhibition on the floor of SMM. Then on 3/5 and 3/6, 2011, NISE Exhibits group members Ali Stein, Catherine McCarthy, and Rae Ostman observed 78 groups of visitors at the NISE Mini Exhibition on the floor of SMM. Observation began as visitors entered the exhibition area and targeted families with children. One member of the group was chosen (frequently a child) to follow and record actions and behaviors, as well as interaction with the group. In some cases, group interactions separate from the child were recorded as notes in the overall observations section of the instrument.

Observations in March involved multiple “set ups.” “Set ups” involved changes to exhibit pieces throughout the observation period, as well as the number of exhibit pieces being observed. Of the 78 observations in March, 40 were of visitor interaction throughout the entire mini exhibition. The remaining 38 observations focused on a particular exhibit piece: 15 for I-Spy, and 23 for Tippy Table. All 23 observations in January were of visits throughout the entire mini exhibition.

### **Instrument**

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The observation instrument recorded the makeup of the group and the total time the group spent in the exhibition. Check boxes were used to record whether the group visited a particular exhibit piece (i.e. looked at it), whether they used it, and if they read any text for that piece (when possible to tell). Additionally, observations of an adult/child interaction at any exhibit piece were recorded using check boxes to show whether the adult offered physical and/or verbal facilitation to the child. Check boxes were also used to show if a visitor read the Flip Cards and to what extent they read them. Flip cards typically had text on the topside, on the flipside, and underneath the flip card, with one exhibit piece having an additional amount of “Reveal” text underneath a second flip card. Finally, observers made notes of visitor/group behavior throughout the interaction at the mini exhibition.

### **Limitations**

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Since the exhibition had multiple entry and exit points, sampling may not have been “even.” Most of the collection in January happened on a Saturday that included an event. Traffic was high, and hearing conversations difficult. Similar conditions happened for the March observations occurring on an extremely busy Saturday; the Sunday observations were less busy. High crowding in the exhibition may have influenced how the exhibit pieces are used. In January, observers initially attempted to record the number of people who walked out after fewer than five seconds, but largely abandoned that effort. In

March, they recorded when an exhibit was occupied preventing use by the visitor group being observed.

## Results

### Time in exhibition (n=63, excludes single component observations)

Overall (n=63): Mean: 4:04, Median: 3:50, Range: 0:20-13:00

January 2011 (n=23): Mean: 3:37, Median: 2:47, Range: 0:20-8:46

March 2011 (n=40): Mean: 4:19, Median: 3:54, Range: 0:20-13:00

### Time at individual exhibit pieces

Visiting an exhibit did not imply use (e.g., one visitor in the March 2011 “All Set Up” sample visited Tippy Table for just a few seconds and watched as a child played on it). Table 1 includes all observations for both January and March, for all setups. The number of visitors varies between individual components, as 38 observations focused only on a particular exhibit piece (15 for I-Spy, and 23 for Tippy Table) and not on the entire exhibition.

**Table 1: Times for All Cases Observed at NISE Mini Exhibition by Piece (n=101)**

	I-Spy	Build a CNT	S, S, N	Tippy Table	Seating Area
<b>Average</b>	1:17	1:24	2:15	2:34	1:50
<b>Median</b>	1:30	1:00	1:55	2:00	1:00
<b>Minimum</b>	20 sec	1 sec	20 sec	5 sec	10 sec
<b>Maximum</b>	4:43	4:00	7:30	8:19	10:00
<b>Visitors</b>	41	22	52	49	18

In the “All Set Up” samples, observations in March showed longer average and median time visits in all but one case, median visit time for Tippy Table.

**Table 2: January 2011 “All Set Up” Times Observed at NISE Mini Exhibition by Piece (n=23)**

	I-Spy	Build a CNT	S, S, N	Tippy Table	Seating Area
<b>Average</b>	1:06	50 sec	2:14	1:22	1:16
<b>Median</b>	1:00	30 sec	1:30	1:30	45 sec
<b>Minimum</b>	20 sec	1 sec	20 sec	10 sec	20 sec
<b>Maximum</b>	2:00	3:00	7:30	3:00	4:00
<b>Visitors</b>	8	7	22	7	8

**Table 3: March 2011 “All Set Up” Times Observed at NISE Mini Exhibition by Piece (n=40)**

	I-Spy	Build a CNT	S, S, N	Tippy Table	Seating Area
<b>Average</b>	1:22	1:40	2:15	1:59	2:18
<b>Median</b>	1:15	1:30	2:00	1:00	1:00
<b>Minimum</b>	20 sec	15 sec	25 sec	5 sec	10 sec
<b>Maximum</b>	4:43	4:00	6:00	6:00	10:00
<b>Visitors</b>	18	15	30	19	10

## Visit, Use and Read

Table 5 shows the breakdown of visiting, using and reading at an exhibit piece by exhibit arrangement. The greatest number of observations came during the All Exhibits and 1B Tippy Table Pictures Taped to Blocks set up where the number of observations equaled 34. The greatest number of visitors spent time at Smaller, Smaller, Nano (SSN) (see both Table 4 and Table 5). In January, SSN had nearly three times as many visitors as the four other components. In March, SSN had at least a third more visitors than the other components in the All Exhibits setup arrangements.

**Table 4: NISE Mini Exhibit Visit, Use and Read by Set Up and Component**

			I-Spy	Build a CNT	S, S, N	Tippy Table	Seating Area
Current Exhibit Arrangement	All Exhibits January First Round (n=23)	Visit	8	7	22	7	8
		Use	8	4	21	7	8
		Read	7	0	11	1	4
	All Exhibits and 1B Tippy Table Pictures Taped to Blocks (n=34)	Visit	16	15	26	18	17
		Use	13	14	24	13	14
		Read	14	7	16	7	5
	All Exhibits and Pictures Taped to Blocks Plus Cute Blocks (n=6)	Visit	4	3	6	4	0
		Use	4	2	5	2	0
		Read	4	3	5	2	0
	Just Tippy Table Pictures Taped to Blocks Plus Cute Blocks (n=9)	Visit				9	
		Use				8	
		Read				8	
	Just Tippy Table 1D Pictures with Words and Cute Blocks (n=14)	Visit				14	
		Use				14	
		Read				11	
	I-Spy New Reveal Only (n=15)	Visit	15				
		Use	15				
		Read	15				

Overall numbers showed I-Spy visitors tended to both read and use the piece, and fewer visitors tended to read at Build a Carbon Nano Tube and at the Seating Area. (Table 5.)

**Table 5: NISE Mini Exhibition All Cases Visit, Use, Read by Piece (n=101)**

	I-Spy	Build a CNT	S, S, N	Tippy Table	Seating Area
<b>Visits</b>	43	25	54	52	25
<b>Use</b>	40	20	50	44	22
<b>Read</b>	40	10	32	29	9

\*Includes additional observations on only those exhibit pieces so a direct comparison across columns is not possible.

The March observations were paired with changes to the mini exhibition including the addition of reading rails (with the flip cards) to each banner, new blocks for the tippy table (blocks that reinforced the metaphor of balancing a nano future- things like blocks that say "Nano Factory" or "Nano Research"), and there was a reveal added to the I-spy component (a picture that shows you where to find the different objects). Table 6 shows All Set Up Visit, Use and Read observations by exhibit piece between the January and the

March periods. Table 7 provides this information as percentages with Use and Read being a percent Visit.

**Table 6: NISE Mini Exhibition “All Set Up” Visit, Use, Read by Piece and Observation Period**

	I-Spy		Build a CNT		S, S, N		Tippy Table		Seating Area	
	Jan (n=23)	Mar (n=40)	Jan	Mar	Jan	Mar	Jan	Mar	Jan	Mar
<b>Visit</b>	8	20	7	18	22	32	7	22	8	17
<b>Use</b>	8	17	4	16	21	29	7	15	8	14
<b>Read</b>	7	18	0	10	11	21	1	9	4	5

**Table 7: NISE Mini Exhibition “All Set Up” Visit, Use as a Percentage of Visits by Observation Period**

	January 2011 (n=23)			March 2011 (n=40)		
	Visit	Use*	Read*	Visit	Use*	Read*
<b>I-Spy</b>	35%	100%	88%	50%	85%	90%
<b>Build a CNT</b>	30%	57%	0	45%	88%	55%
<b>S, S, N</b>	96%	95%	59%	80%	91%	66%
<b>Tippy Table</b>	30%	100%	14%	55%	68%	41%
<b>Seating Area</b>	35%	100%	50%	43%	82%	50%

\*Percentages of visitors who used and read are out of the number who visited the exhibit piece.

## Reading Rail Flip Cards

Table 8 through Table 11 show visitor use of the new reading rails with flip cards added to the mini exhibition for the March observations. The “Seating Area” did not have a Reading Rail. In all but one exhibit piece, SSN, the sample size is one more than the number of visits to the exhibit. In this case a visitor was not observed to visit the actual exhibit piece but was observed to visit the reading rail set up next to the respective exhibit piece.

“I-Spy” has a disproportionate high number of flip card use, as the flip cards were part of the exhibit and not a separate piece. Of the other three pieces, “Tippy Table” had the greatest amount of use.

**Table 8: “I-Spy” Flips (n=36)**

	1	2	3	4
<b>Top</b>	22	26	29	25
<b>Under</b>	18	23	25	20
<b>Bottom</b>	16	20	22	20
<b>Reveal</b>	9	8	12	11

**Table 9: “Build a Carbon Nano Tube” Flips (n=19)**

	1	2	3	4
Top	2	3	2	4
Under	1	2	2	4
Bottom	1	2	2	3

**Table 10: “Small, Smaller, Nano” Flips (n=32)**

	1	2	3	4
Top	7	6	5	4
Under	7	6	5	4
Bottom	6	5	4	3

**Table 11: “Tippy Table” Flips (n=46)**

	1	2	3	4
Top	11	10	10	9
Under	9	9	9	7
Bottom	9	9	9	7

### **I-Spy and Tippy Tables: Saturday and Sunday Visits**

Observers in March speculated as to the effect of crowding from Saturday to Sunday on the two exhibit pieces sampled independently of the other pieces. Table 12 looks at these two pieces, “I-Spy” and “Tippy Table,” in both the All Set Up and independent observations and by day observed. Variables compared are number of times visited, used, and read, as well as the use of the associated reading rail with flip cards. An adjusted sample size is provided which takes into account the times the particular exhibit was occupied preventing the group from using it.

**Table 12: “I-Spy” and “Tippy Table” Visit, Use, Read and Flip Card Use by Weekend Day**

		Occupied Stations/Adjusted “n”	Visitors	Flips	1	2	3	4	
I-Spy	Saturday All Set Up (n=40)	5/35	Visit	20	Top	12	14	17	15
			Use	17	Under	8	11	14	12
			Read	18	Bottom	8	11	14	12
					Reveal	2	5	6	6
	Sunday (n=15)	0/15	Visit	15	Top	10	12	12	10
			Use	15	Under	10	12	11	8
			Read	15	Bottom	8	9	8	8
					Reveal	7	3	6	5
Tippy Table	Saturday All Set Up (n=40)	7/33	Visit	22	Top	7	6	7	6
			Use	15	Under	6	5	6	5
			Read	9	Bottom	6	5	6	5
	Saturday (n=9)	0/9	Visit	9	Top	0	0	0	0
			Use	8	Under	0	0	0	0
			Read	8	Bottom	0	0	0	0
	Sunday (n=14)	0/14	Visit	14	Top	4	4	3	3
			Use	14	Under	3	4	3	2
Read			11	Bottom	3	4	3	2	

## Observations

### I-Spy

- Girl touches bunny, pushes phone button. Butterfly, doesn't read or look for objects. Leaves then returns to I-Spy because grandpa is there. Grandpa reading label. Leaves and returns again. Grandpa explains computer chips to girl and how many tiny parts it has.
- Boy smells, listens to cell and touches bear (no abuse). I think he looked at it all but did not search for the items. Uses it alone.
- Pushed butterfly, the phone, touched Benny. Read Benny label. Didn't look for things in picture.
- Pushed phone, pushed butterfly, moved to ferrofluid. Didn't look for objects in image.
- Looked at wall.



- Smells orange extract - mom reads label. Pushes phone button and reads label - didn't look for objects in picture. Touches Benny - squeezes stomach while father reads flipping label.
- Girl 9: "Is this nano?" (About the bear). Father reads flip card to daughter. They move to SSN.
- Boy 9: "Is this a nano bear?" Adult shows flip card to child. Adults stay, pointing at board, guessing what is nano. There is talk identifying what is nano and the group used all the flip cards.
- [Look for I-Spy?] Yes. [Interact with interactives?] Yes. [Use reveal?] No. [Nano Connection?] n/a
- [Look at I-Spy] No. [Interact with interactives] yes. [Flip flips] No [Using reveal] No. [Talk about nano connection] No. Uses 2 components - no flips - just buttons.
- [Look for I-Spy] No. [Interact with interactives] Yes, repeatedly. [Flip flips] Yes to get answer. [Using reveal] No. Don't read carefully, but do check each answer. Saw reveal was there, but didn't use.
- [Under "read"] read text and looked at picture very briefly.
- Occupied. Man reading flips in detail, but not person/group being observed
- (Group leaves halfway through to see math core.) [Talk about nano connections] I couldn't hear it was too loud. D= 4th thing they do. Mom and two kids go to I Spy/ Do each flip starting on the right. Feel fuzzy bear. Push buttons at each. Grandpa comes to get and girl is reluctant to go. TUB Go left to right.
- Occupied at beginning by another group.
- Boy appears to read, pushes buttons one by one with mom (right to left). Doesn't use flips, but reads tops. Doesn't appear to do spying. Dad is looking around at big titles in the area and not looking at this exhibit.
- B) Girl and mom do each one. Look up and down at the photo. They appear to be reading independently. Goes right to left.
- Occupied only some of time.
- Mom reads flips on I-Spy and looks at banner she touches Benny, presses buttons, seemed drawn over by butterfly (pressed butterfly first).
- Observer notes they came back around noon sat on couch and looked at I-Spy. On second visit looked and pressed buttons.
- Don't even notice.
- Mom points banner out to dad. Dad presses both buttons, touches Benny, reads banner text.
- Read banner, push buttons, smell, rub fleece. For flipping cards, all 4 had U and B circled but observer indicated she was uncertain if they had been read or not, so they are not marked as such.
- Mom reads aloud, presses all buttons. Reads flip card questions aloud. Girl looked at some flip cards but can't read.
- Read banner, pressed buttons and touched Benny. No smell. On flip care number 4, looked at reverse side but don't do I-Spy.
- Girl did I-Spy alone, press buttons, touch Benny, smell.
- Press both buttons; dad and girl look for butterfly in banner (point).
- Press button, point to all butterflies. Talk about butterfly, look for it. Boy (16) came back to I-Spy three times, read all flip card and pointed to banner.
- One teenage girl returns, does flips. Looks intently at butterfly. Looks for objects in photos (butterfly and chip). Moves to next station.

- Parents go over, several of the kids join them. -Push buttons, look at butterfly, feel bear. Boy ~6 year old, looks at reveal and picture book back and forth, carefully, by himself carefully.
- Adult looks at butterfly carefully. Does some flips. Pushes buttons.
- One girl did flips on own.
- Occupied.
- Did Smell, Sound, and Butterfly; looked carefully at photo and back at flips; dad pushed butterfly button several times and looked at butterfly; looks up at image and back down several times
- Move L to R; find objects on big photo after looking at first reveal (smell); don't look at other reveals; walked up to exhibit even though a woman not in the group was using phone and butterfly; smell several times, point carefully, points to photo objects, point carefully; does sound; looks carefully at butterfly, finds objects; did Benny, actively points to items in big picture, shows brother Benny in big picture
- Looked initially at photo, clearly seem to be looking for objects, R to L, start with Benny, pushed butterfly button several times, tried to push smell grating; after going to other exhibits Dad comes back and looks at banner for ~7 seconds
- Looks and pushes button; drifts toward couch then walks back to photo again; leaves to be with kids at SSN; returns and looks at big sign; about 5 min later dad returns a 3rd time and glanced again at big image and used other exhibits in mini exhibition
- Start at butterfly, then R to L, looked up and down at photo several times; came back with son and did butterfly and phone for 30 sec
- Walked into exhibit; looked at I-Spy quickly, pushed buttons; \*\*spent over 5minutes at couch reading, girl read "How Small is Nano?" book aloud to father, used hand reading board
- Mom starts then girls join; all read; don't talk, start at butterfly, R to L, then Benny last
- L to R; looks up and down at big picture and flips several times; pretty quick experience but seemed to read some flip text
- Starts with butterfly; looks at image and reads big sign intently for a while; reads flips carefully
- All 3 adults use simultaneously; the 2 women talk and point together about exhibit; older women leaves, but comes back to read the Benny flip
- Bald Dad: push button on butterfly several times; stand next to CNT for a long time while toddler builds; drifts and glances at large photo several times; leans against flip shelf; then starts to do flips
- Mom looks at photo and reads to self while girls are at CNT; 2 daughters come over by themselves, do several flips, look up and down; point to reveal 1 by 1 and up and down, points to wall several times; no talking
- No talk about nano; intently read flips; look at butterfly carefully; point to reveal; felt Benny fur; re-read the Benny text carefully; mom reread butterfly and opens and looks at reveal flap again and up again at wall several times
- R to L, start at sound; look up at big picture several times while looking at flips, reads intently, leaves to use SSN.
- First time through flips don't notice reveal, at smell notice reveal; start at Benny; R to L; then L to R looking at each reveal; boy smells several times; open and reopened flip; mom sees reveal and goes back to each; re-open Benny flip and read together; point up and down at wall; point to big picture; talk and point; can't find

all the items for butterfly and look at reveal again and back up and down at big picture

## Build a Carbon Nano Tube

- Starts building CNT - didn't appear to read. Not building exactly correctly, but the placement of holes in pucks guides her construction - didn't build it wildly differently. Returns to I-Spy
- Boy looked at, touched, did not use. Exited exhibit.
- Touched the pre-built CNT puck as she left.
- Kids start building - girl kneels on ledge. Dad just watches. Girl moves to ferrofluid table. Later, comes back to CNT - fits a few pieces together, not in the "correct" pattern. Then fills center of CNT with extra pieces and says, "Look its a campfire!" Leaves with her group.
- Starts to build a few pieces then runs off.
- Just touches the CNT and moves on to I-spy.
- Boy started to build, mom offered help. Stayed just a short time.
- Mom hands pieces to girl - very small - barely walking. [Talk about nano connection?] No.
- Says, "Carbon nanotubes" as builds. Adds inst. a few pieces/ boy only.
- [TUB] Mom glanced at on the way out. Dad read all flips.
- Look and flip flips attracted Jon. Wander off.
- [Build CNT] add on to pieces. [In shape of CNT] Yes. [Reaching pieces through] No. Visit 2 times. "Are you going to build a nanotube?" [Dad] Dad shows where to put pieces more around all sides to add on.
- [Build CNT, in shape of CNT] Yes. Grandma and kids build and talk. Mom reads and watches. [Next to TUB] Mom looks and appears ready to use - son urges her to come see dinos.
- [Climb to build higher?] Yes in two groups. All three together Dad and 2 boys - long time. Then two - then dad and other boy - long time.
- C girl mom and boy all build together. Mom kneeling on floor. (Grandpa has left to see Math Core exhibits).
- Occupied much of the time by other groups.
- Occupied in use by other large group.
- Occupied some of time.
- Occupied the whole time by other group.
- Youngest girl by herself starts building, then mom joins briefly, they build up-add to pieces already there. Dad suggests they follow older girls - all leave.
- One boy walked up and kept playing even after being invited to sit on big chair with whole family. Mom helped build and whole family.
- Not facilitated by parents, helped other child build up and add pieces.
- Occupied for first part of visit.
- Dad starts building alone, builds in correct shape, boy starts building. Mom compares to another exhibit with small pieces where you had to "build atoms."
- After returning toy--built CNT together.
- All build together. Mom reads aloud directions.
- Read labels first, build a little.
- -Two of them building together. -Joined by another family group who hovers/builds some. -Girl leaves and returns. -Parents join and all chat.

- -Half of groups uses. -Group comes and goes with parents and five kids, and reconfigures.
- Man just glanced at. Woman read one of flips and read banner.

### **Small, Smaller, Nano**

- Grandma called him over to ferrofluid - shows him how to use it - kid goes to iron filings and plays briefly.
- Grandpa didn't use the interactive, realized his group left so he left. Read label. They came back: Grandpa calls girl over to steel beads. Facilitates it, then tries the ferrofluid, then filings. Girl uses filings with grandpa watching. He shows another kid how to use the magnet "properly."
- Girl uses magnet at beads. Used it "correctly" with no help. Other girl at ferrofluid. Dad calls son over to ferrofluid. Dad tries it. Girl 2 at beads: "Look daddy, it's standing." Son grabs CNT pieces. Girl 1 watches dad use it, moves to ferrofluid - shows daughter how to use magnet ("properly"). No nano talk.
- Boy, "Look at this one" (ferrofluid) - uses magnet "correctly." Tries the beads - then moves to tippy table.
- Steel beads first - tries magnet on globe then under, reads labels, moves to filings. Looks at banner. . Calls her grandma over (grandma is busy watching grandpa use beads - she's reading labels and makes connection of things getting smaller "there's three sizes, so...") Both watch girl at filings. She moves to fluid. Grandparents leaning over girl to watch.
- Mom reads labels. Son plays with beads. Mom, "Lets try this one." Boy goes to filings and ferrofluids. "Mom check this out," boy. He leaves for CNT. No nano talk.
- Boy used one bubble, father reads label silently. They leave for tippy table.
- Boy, "They are magnetic." He plays by himself with one bubble for about a minute then goes to tippy table. He returns and goes back to ferrofluids. His dad explains it. Boy is engrossed with forehead pressed against the bubble for about 2 minutes.
- Beads - magnet on dome, then under table. Then moved to ferrofluids. Then to filings - mom just watched, no facilitation.
- Father uses ferrofluid, reads the label quickly - lets son use it. Father sitting on stool, kid standing next to him.
- Watches another girl use steel beads, then uses ferrofluid magnet under table. Moves to filings - by herself completely. Dad not helping her. Using magnets vertically.
- Woman is watching partner who is manipulating.
- Using the magnet, on end, then diagonal, then paint roller. Other stations are full; he is diligently manipulating. Watching for an opening. Gets another spot. Three minutes at first spot, one minute at second.
- Steel beads - kid plays while adult watches, moves to ferrofluids. Uses magnets correctly. Moves to filings, "Whoa!" Calls his friend over, "This is really cool!"
- Boy kneeled down to use magnet - mom reads labels out loud. Boy moves to ferrofluid. Parents are leaning over the dome while boy kneels. Dad tries it.
- Man read the wallboard near SSN then continued on his way. I would say he was about to be a walkout but then something caught his eye.
- Boy used one station, the middle one, moved on.

- Used only ferrofluids. Adult illustrates some properties by using hands in stacking motion. Then they all head out quickly.
- Girl goes to Ferrofluids. Has trouble with magnet. Asks dad for help. Dad, "Maybe it's the way you hold it." Girl uses second, then third piece. Tries all of them. Returns to compare. Father not at the interactive now. He is reading big board to son.
- Younger boy and father try different pieces. Busy now. Mom and older boy join. Do different pieces. Boy 9 to boy 16, "What are you trying to make? Just moving it around?" Boy 16, "Everything has to be connected." They try all three. Group finally congregates on ferrofluids.
- Boy tries magnets. I do not hear any nano talk. Mom reads ferrofluid card to boy. He tries them then moves on.
- Girl tries magnet on globe; figures it out. Mom reads while girl does task on middle globe. Other two globes occupied. Moves to ferrofluids. Mom reads label silently. Girl, "These are called nano." Moves to first globe. Calls mom to show how they "go together." Mom tries other two.
- [Using wand?] Correctly - no trouble. Boy steel balls, ff 2nd, iron 3rd, Boy says out loud what materials are. Together at first, then Dad splits to different station. Dad gets book from table and brings over, then sits down to read.
- Reads interactive label. Daughter uses all stations - shows dad call dad back.
- [Using wand] correctly. Dad tells kids to try all three. Tells kids to work together and watch.
- [Wand] 4 year old correctly, 2 year old does some banging. Dad reads label. Mom read label. All use all three stations. Dad watches and discusses with daughter. Lots of talking and moving back and forth among station. Mom glances at banner and flips but doesn't stop. Two-year old flips all and looks at pictures later. 4 year old and Dad read the flips together.
- [Using wand] ok. Uses stations.
- [Using wand] correctly. Visit each station - Dad uses magnet and helps son to see and watch both watch closely.
- [Using wand] correctly. Use multiple stations. Don't talk to each other much.
- "Very cool."
- Talk about difference between materials, move between and compare, use all three stations.
- Uses banner/rail. : 30 look at pictures glance at text.
- [How are they using the wand?] Correctly. Use all stations. Returned second time.
- Used in three family configurations - 2 boys use; then mom and boy. Trying wand on top - don't figure out. - Then Dad and 3rd boy uses. They use wand under table immediately - use 2 stations. (Other station occupied by different family) Dad looks at big signs from distance.
- Occupied.
- A) Start here: All four in group do together, then 3 year old girl "What is that? What is that?" Several times point to flip door with the apple on it. Goes right to the flip with the apple. Whole family goes around does all flips together. B) Do flips.
- After leaving static, dad glances at signs all around and seems to read large text. Dad attracted to exhibit. Try use together (Dad and girl). Toddler walks off and

- girl stays and uses 2 stations by herself. Dad says to kids. I want to show you something cool and takes kids to table and start using magnet wands under table.
- Use quickly - use wand under table right away. Mom calls boy over to look at.
  - A) Started here - went right to table and using wand underneath the table immediately. Other 2 seats are occupied at the table. Mom walks around to CNT.
  - C) Girl comes back to table when other seats are empty and calls mom over. Do all three stations.
  - He comes back several times waiting for turn. Boy waits, try one stations when not used and watches others. All the seats are occupied; he watches over shoulder of other families. (Occupied by ~ 6 people).
  - Two older girls-played at all three stations. No discussions. Use wands over and under table. Spent more time together at filings, quick pass at ferrofluids.
  - Totally occupied the whole time. Boys joined other visitor groups to watch but never held wands.
  - Parents help, talk: "Look, I want to show you something..." Dad tapping wand on bottom plate. Use above and below. One boy pushed out by older kid from another group, then comes back.
  - Used first by one girl--brought whole family over--mom uses alone (1 station) (Used all three stations). Boy uses all three stations. Mom reads table sign.
  - Occupied by another family. Flip cards open, don't read.
  - Uses all three stations pretty quickly.
  - Mom talks about comparing three stations, reads labels aloud. What each material is. "That one is called ferrofluid" etc.
  - Read table graphics, look at power together, less interested in ferrofluid, take turns at all three stations.
  - Girl did all three stations. Occupied by other group. Grandma read flip cards after girl left.
  - Boy (11) did Ferrofluid. Boy (16) did all three stations.
  - Teenage girl sits down and works on, immediately uses under table. Very intent.
  - -Sit down at all seats, doubled up and used immediately. -Talk to each other about what is happening.
  - -Man starts using first, woman joins him at her own station and then joins him. - Used wands, no problem. -Glance at bigger banner on way out.
  - Boy starts here. Dad uses after for short time. Boy returned on way out (Dad and boy leaver toward Math Core).
  - Discussion. Did ferrofluid and powder stations. One boy left quickly. One boy and one girl looked at ferrofluid together.
  - Read all table signs. Occupied by kids.

## Tippy Table

- Child by himself. Holds table steady. Lets go of the additional pieces. Manually tips the table. Holds table as he places pieces. Realizes his group left and he leaves.
- Sits at stool and spins table to slide it around. Grandma comes over, read's label and starts to place more objects - girl still manually tipping the table.
- Used shortly.
- Boy and father place blocks on table together. They talk a little but I can't hear what. Father does not go around table to read all text. Table tips, they exit exhibit.
- Boy, "Let's balance this." Boy plays and goes to seating area.



- Build on table. First younger boy but he and adult go to SSN. Two (mother and boy 15) continue to build entire scene. They complete scene then move to where others are (SSN), and boy clears tippy table. I did not hear any talk about nano.
- Built a whole scene and it fell twice.
- Dad reads exhibit label. Daughter wobbles table.
- [Read all text?] Yes on exhibit. [Talk when doing it?] Yes. Put blocks on - talk about trying to balance. Work with little girl from different group. 2 year old stays a long time; 4 year old loses interest after 30 seconds. [TUB] Dad read all.
- [What people do] Play balance game. [Read all text] Yes. [Talk with each other while doing it] Yes. Returned several times. Talk about what goes where "Lets put the fish in the stream."
- [Read all text] Read don't use.
- Occupied by other family most of time.
- Occupied some of time.
- Occupied whole time by another group.
- Occupied most of the time at beginning, then girl is joined. Girl uses on her own (Dad has left to follow toddler). Girl is joined after ~1 minute by a different family dad and 2 kids (< 5 years old). The other dad talks to all kids and says it is a tippy table. Girl stays and uses with other boys for a long time working on blocks and balancing together. They are all too young to read.
- C) Dad starts by himself. Calls mom/boy over. Talk about balance/tipping. Boy wants to go heads towards dinosaurs.
- D) Girl calls mom over. Mom and girl work on together. Talking about blocks. They work together and talk about blocks and [can't read]. Another group comes by and Dad comment "Oh- city planning." Then toddler and mom and boy come back to build a city and join in and then hover nearby waiting for a turn until girls leaves to go to Science on a Sphere.
- Boy uses table. Rebuilds several times. Re-sets the table, and re-builds. Mom walks by and he shows her what he is doing for < 5 seconds.
- When they first arrived table was occupied and they watched some kids playing.
- Mom read label on table, points with finger at labels--talked about balancing all the different buildings and blocks and where they belong.
- Older boy and dad use together, talk about balancing and shaky (don't shake).
- Mom and boy together, mom leaves, dad joins, mom comes back, careful placement of pieces, talking about pieces, reading table text aloud. Boy says the hard part is that you have to put them in the right places (points to neighborhood label). Dad reads some of banner while sitting at table and says, "This is about where to find nano in our world." Girl briefly looks at flip cards, then all leave to "go do something else."
- Dad and boy place blocks carefully. Boy alone puts block on table randomly.
- "Why does the world tip?" Placed a few blocks, table tipped pretty fast and they just walked away.
- Place one block, read table graphics.
- Grandma read flip cards after girl left.
- Boy (16) read banner. Read flippy questions but no flipping of cards.
- Occupied by young boy. Girl walks to and glances at boy.
- Half of group uses for about one minute.
- Occupied by boys.

- Careful placement of blocks, talking about where blocks should go, use with whole family.
- Occupied.
- Glanced at table.
- Asked me how to use - I explained. Boy: "Let's build a town and make an earthquake!" Later, tipping the table: "I'm a giant monster destroying the city." Chose specific blocks and placed in different areas. Boy walked all around to find blocks he wanted for different areas. Talked about making a city and balanced it. No nano specific conversation.
- Each sat in an area and worked to build their quadrant while keeping the whole balanced. Woman at Nature side: "Need more environment! I need some trees! Bushes!" Man at Government side: "Gotta get some government." Completely understood concept of balanced world/future. Didn't overhear nano-specific conversation. There was both physical and verbal interaction, but as this was an adult only group, the facilitation variable is marked as NA.
- Read text, looked at the table. Said, "It's balancing the nano future." Left exhibit.
- Challenged selves to get all the blocks on the table. Looked at blocks. Identified them, discussed where they should go and placed them. Adjusted for balance. Sample conversation: "This is heavy." "Then put it in the middle." "We need a tree here." "That's really heavy. Where can we put it?" "We still have more blocks--we need to get them all on." "Here's a skyscraper." (Hands it over.) "I have some flowers." "Here's a car." "Put the person here." (They finish, tip it on purpose and leave.) This is an all-adult group, so facilitation is marked as NA.
- Mom read all text and explained activity. Mom did every block and let kids put on table. "You have to balance your nano future. You have to balance the blocks, OK?" (Repeats) "Where should we put the house? You have to balance it." "These are animals. Where should they go?" "There's the bank. Where should the bank go?" (Continues to ID each block and help kids place them.) (Let's the kids place but adjusts to help balance.) "Here's a hospital. Should we build a hospital? Where should we build it?" "Whoa! You have to put something over here!" "Here, you put the hospital on that side, why don't you put the ship [factory] on this side?" (Continues) "Good job! Yay! You built your city!" -- No nano-specific conversation other than stating challenge (nano future) explicitly at beginning.
- Mom explains challenge is to build future city. Quickly settle on strategy to place large blocks first and fill in smaller blocks. Son moves around exhibit to choose blocks he wants and place them. Very careful and deliberate placement. Mom helps out: "Uh oh! Too many." "You've got to balance it. You have to get them all on evenly so it doesn't dump." "Let go of it (table). See what happens." "Uh oh." (Tips. They start over.) Son: "Hold it (the table)." Mom: "No, I'm not going to hold it. You've got to put more stuff over here so you can balance it out." Mom helps son figure out what to put where. They identify blocks. "Bank." Son plays with blocks ("Beep, beep!" with the cars.) -- No specific nano conversation.
- Mom: "You have to balance it. See, fish go in water." "You have to get all this under here up on the top without making it tip." "Now, where does this go?" "What's this?" (Puts animal in park.) "There's a lot of stuff here still." No nano discussion.
- Play a little than get strategy. Start by setting up large buildings. Then add small blocks. Teen: "Need a bus?" "That's pretty heavy." (Table tips and everything falls.) (Boy starts over.) Boy: "Sky scrapers!" "Look it, I'm making a building."



- (Stacks skyscrapers on top of each other.) (After a while teen loses interest but sits and waits while boy plays, watches and looks around. -- No nano-specific conversation.)
- Mom and dad read. Boy tips table but doesn't place blocks. They leave.
  - Listing items, need to balance; asking specific questions about placement of blocks together but not paying attention to areas on table; lots of talking about balancing; cars on roads; looked for words on blocks; asked child if block had words; discussed physics of exhibit
  - Lots of carefully placing one block in the "right" area and then stepping back to see if it would balance; mom seems bored and drifted away, then came back excited after first crash; talking together about blocks and area; not nano specific; reading aloud; girl and mom leave after 3 min and glance through 2 flips on way to science on a sphere; boy plays by self; very careful placement
  - "We have to build our city"; "can you build a stable nano world?" talk about specific placement of blocks by size; "where should you put this big/ small one?" concerned with balance not area
  - Children work together; then parent and children work together; cars on roads first; build a dam of blocks to prop up table; "do you want to balance the nano with me mama?" "Put more on this side"; little attention to areas
  - Nice pretend play and storytelling: "I'm a cop."; walking around looking for specific different blocks; choose all the big blocks and placed first ("because so big") then filled in with little blocks
  - Took picture of child with built city; random choosing, random placement
  - Came right over to table from stairs, mom: "do you want to do this table, you liked this table last time, name"; encouraged balancing verbally; slid blocks around for a while; boy collected all the cars; mom read label on table graphic aloud and asks "Can you build a stable nano future?" boy drives cars around edge; mom leaves and boy continues to use table on own; stick his arms up from bottom though gap and down through gap from above to get blocks; doesn't get hurt!
  - Build a city, careful placement; place all blocks in concentric rings; talk and refer to building by name
  - Read banner; take photo of banner & reading rail; grandma leaves for SSN; grandpa looks at all the tops of the flips (walks across); goes over to table and reads all table graphics (doesn't use blocks); goes back to flips and reads middle 2
  - Read table text, careful placement of blocks into areas; read blocks and table text; multiple arrangements; returns with child and use together
  - Diligent reading, looks at tippy table and reads some table text, places car on road
  - Dad reads table text aloud; asks, "What's the point to it?" "Balance a stable nano future"; careful placement of specific blocks into 'right' areas; read block labels aloud; girls have a discussion about where to put some blocks (apt, duplex); dad picks up fish: "ooh fish, nano might be bad for nature"; they clear everything off and dad says "clear slate, that's the best policy"; try again with more random, less thoughtful placement; joined by some other little kids (not same family group); Dad says "let's get the heck out of here while we're still safe and it's still balanced"; dad glanced at banner when first came over, but occupied by readers
  - Place blocks together; talk about balancing; random placement no attention to areas; good group dynamic and team work; taking turns to choose a block and place

- Diligent and careful reading; read flip 3 first; read banner, then all flips; this guy is a 'reader' walked over to static and read that label; read all flips on what's new about nano reading rail

## Seating Area

- Static beads - grandma talks about what is happening - why larger beads aren't "getting stuck."
- Girl sees grandma using it [static beads] and goes over. Grandpa talks about size of the particles. Girl, "Wow, that is cool."
- Used beads, exited exhibit.
- Plays with static rotators, spinning them by himself. He reads the text alone, silently. Mom sits on couch with baby. He sits for a sec then goes to I-Spy.
- Static beads - son spins, father says, "making static."
- Both spin, talk, they might be reading. Slowly spinning.
- Waits in line to use static beads. Mom reads labels. Boy spins small then big beads. Whole family gathered around the interactive - mom explains what is going on - boy goes to Science on a Sphere (after 5:05 min total). Dad and girl sit on couch, boy returns and sits on chair for a few seconds before leaving the space.
- Do not sit. Mom reads information to son. They turn the static rotators. She asks why the small balls roll differently. Boy does not answer, moves to CNT.
- [Read boards or books] No. [Parents sitting with children/Group dispersed] No. [Play with static beads] Yes and read label and talk about it. [Talk about nano connection.] Yes.
- [Reading boards or books] No. Don't sit. [Play with static beads?] Yes - Dad reads and explains both kids try several times and compare [1 minute].
- [Played with static beads]. Turns repeatedly, watches beads closely. Dad not there to help.
- [Static beads] yes spin.
- Cold virus stuffy - "What's that?" (Son). (Dad) "It's a pillow shaped like (checks) a common cold."
- After a while adults sit while kids (boy) play with static beads.
- Sitting in chair. Reading nano book for adults. Reading intently (not looking up for long stretches and not looking for family - then does and suddenly. Leaves to find family at Science on a Sphere.
- [Read boards or books?] No. [Group dispersed?] Dispersed. [Talk nano] No. Group starts here - toddler comes in to the space and climbs on couch to use static the rest of the family follows. Use static several times. Toddler climbs on couch 3 times.
- Couch occupied by other group. Girl is holding plush using phone. The other group is there > 5 minutes.
- Chair and couch occupied. Mom looks at static beads and tries. While girl at small smaller nano table and uses very quickly.
- Boy uses static beads very quickly and looks at.
- One boy carried plush toy for about 13 seconds. One boy used static beads first alone, then with two boys talking about how cool it looks and spinning fast.
- Observer notes on second visit, sat on couch.
- Girl and grandma read table text for static beads and talk about beads moving in different ways. Grandma: "They move differently."

- Mom sitting in chair and talking to other kids and husband.
- Run over to germ, hold plush toy for whole visit, take it to Math Core, come back to return toy.
- Man sat in chair for about 10 minutes. Woman used exhibit, compares turn one, sat. They all talked about plan for day while sitting. Interacted with other child over plush toy.
- Talks about static- do together. Read label aloud.
- Sat on couch, spun disks.
- Boy (16) sat on couch.
- Couch and chair occupied whole time by older couple.
- Occupied the whole time by older adults.
- Occupied the whole time by older adults.
- Occupied.
- Occupied.

## Overall Comments

- Breezed through, but grandparents seemed to facilitate.
- Grandma and grandpa walked straight through. Grandpa stayed and checked out the steel beads, read label. [Then his group came back and used the exhibit piece].
- No nano talk, short visit.
- No nano talk, used shortly.
- This family did most of the exhibits but split up. The boy I observed did many exhibits by himself. They did not use CNT. Another group was using building a big CNT during the time they were in the exhibit.
- Dad was aloof. Not engaged.
- Adult couple came in after walking down stairs. She wandered more (she is the official target) while he spent time with SSN.
- Dad is sitting at seating area while son is at SSN. They check in visually at times.
- Kid was really into it. Thought it was cool, but didn't read instructions or labels. Adult just watched - no facilitation.
- Parents sat at the couch with little girl for quite a while after interactives - no reading, just chatting. The mom and little girl also watched others play with the tippy table for about 30 seconds.
- Father visited the tippy table with his son while the girl was at SSN. He read the big board aloud to son. Did not use the table at all.
- Very few walkouts at this time. It is busy but people are staying for short periods.
- Dad sits on chair and reads book (Nano-technology demystified was on top of pile.) starting at 3:00. Boy goes to Science on a Sphere after 4:30. Dad stays and reads until 5:10.
- Dad tells son needs to read labels and [can't read] thing out - reads out loud, asks questions.
- Group was here at least 3 times. I timed their first visit at 9:00. Both times they returned I was watching another group.
- For 1-ISpy, observer indicated Mom was the one who read. For Build a CNT, for facilitation observer indicated Physical was with mom, and No was circled with a mark indicating it was with Dad. Also for flip cards on 2Build a CNT, arrow shows only dad did flips #3.
- Group was very spread out--seemed comfortable in space.

- Seemed happy to get to sit and chat at Tippy Table, comfortable kitchen-table-like feel for mom, dad, and boy.
- Left to see dinosaurs!
- Girl left but mom/grandma stayed without child.
- Using SSM while I was observing other group. Dad asked what my research question was. They talked and did Static Beads together, read aloud, spun disks, and sat on couch, then did I-Spy together- all flips and left exhibit. Came back and sat on couch together until mom met them and they all left and dad did I-Spy on way out.