
Suitcase Science: The Science Behind People's Stuff



At the Science Museum of Minnesota and Beyond

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Background

Suitcase Science is a community-inspired theatre program and exhibit that highlights many scientific disciplines, including anthropology, biology, chemistry, geology, sociology and material culture. Its development was funded through a Legacy grant from the state of Minnesota.

To help generate topics and ideas to include in the Suitcase Science show and exhibit, SMM held several workshops in communities around the state. SMM staff invited local community members to bring two objects of value, meaning, or significance to the workshop and to share their story about them. These stories and objects were the inspiration for the science-based stories that SMM staff developed for the Suitcase Science exhibit and show.

While the theatrical performance for Suitcase Science generally occurs at the museum, exhibit pieces were developed for each community that participated in workshops. These consist of a small suitcase filled with objects and their science stories, as told by community members and SMM writers. These exhibit pieces are housed inside an old suitcase that is on display at a library in each community. A Suitcase Science book accompanies the exhibit and contains photos of people, their objects, and their stories from across the state. The objects and people in the book are those stories the museum staff used as fodder for the Suitcase Science theatrical production.

The theatrical presentation of Suitcase Science consists of Z, the Object Whisperer acting as a medium through which the objects can share their stories. Z is similar to a ghost or dog whisperer. Each performer displays up to eight objects from which the audience selects three to five for performance. Because the audience selects the objects, each show is different in its science content related to the objects that were selected.

This evaluation focuses on how the theatrical presentation of Suitcase Science was received by SMM visitors and community members around the state. Evaluators collected surveys from 50 audience members at SMM from October 20th to November 7th, 2010 and another 94 at SMM from February 3rd to February 28th, 2011. From April 8th, 2011 to May 22nd, 2011, evaluators traveled with the theatrical production as it toured six locations in four cities throughout Minnesota. They collected 74 surveys from audience members in Moorhead, St. Cloud, Mankato and Rochester, all of which were communities that participated in the program's workshops.

Data was collected differently at SMM shows versus traveling shows because evaluators were able to spend more time with SMM visitors as they completed surveys. At traveling shows, all visitors were handed a shortened version of the SMM survey in order to increase the number of completed surveys collected from these audiences. Data from the traveling shows are presented in the second half of the report.

Where appropriate, SMM and traveling data are reported together. Location-specific questions are in the second half of the report.

General Suitcase Science Results

As previously discussed, theater staff at the Science Museum of Minnesota began performing *Z, the Amazing Object Whisperer* in October, 2010. Evaluation staff interviewed children and adults after the performances to gauge how effectively the program was engaging audience members and informing them about various topics in science. Over the course of two periods of data collection, evaluators collected interview data from 144 people about nearly all of the objects presented through *Z, the Amazing Object Whisperer*.

Program Engagement

Visitors at the theatrical performances at the museum reported their interest in and enjoyment of the show. Over four fifths of visitors reported the shows to be either very interesting or interesting (82%), and very enjoyable or enjoyable (86%). Half (49%) of the visitors found the show to be interesting and a little more than two fifths (44%) found it to be enjoyable (see Table 1).

Visitors who saw the traveling program reported higher levels of interest and enjoyment from the shows. Over two thirds (71%) of visitors found the show to be very interesting and three quarters (75%) found it to be very enjoyable. Of the 74 visitors surveyed, only two rated the show as somewhat interesting, and three visitors rated the show as somewhat enjoyable.

Table 1: Percent of Visitors (n=144)

	SMM (n=144)	Traveling (n=74)
Interest		
Very interesting	33%	70%
Interesting	49%	27%
Somewhat interesting	15%	3%
Not interesting at all	2%	0
Enjoyment		
Very enjoyable	42%	73%
Enjoyable	44%	23%
Somewhat enjoyable	13%	4%
Not enjoyable at all	0	0

Children seemed to find the show at the museum more interesting than adults. Almost all of the children (93%) said that the show was “interesting” or “very interesting,” while only four fifths of adults shared that interest level (79%) (see Table 2). No difference was identified between children and adults through the traveling show data.

Table 2: Child versus Adult Interest of Museum Program

	Children (n=42)	Adults (n=98)
Very interesting	38%	31%
Interesting	55%	48%
Somewhat interesting	7%	18%
Not interesting at all	-	3%

Science Represented

Audience members were asked what types of science they saw or heard about during *Z, the Amazing Object Whisperer*. Visitors shared a wide variety of science topics, content, and connections. To look across all of their responses, answers were clustered under the larger science themes of “History,” “Life Science,” “Physical Science,” and “Social Science.” When visitors only replied with an object, without mentioning the branch of science to which they think the object is connected, we categorized these responses by making the science connection for the visitor. For example, if a visitor saw the pheasant performed, and answered “Pheasant,” then we categorized this as a “Life Science – object only.” These responses are not seen as being the same as a response identifying a specific science, though. If a visitor saw the pheasant performed and answered “Pathology,” we placed their answer in “Life Science,” showing that the visitor potentially has a more sophisticated understanding of the sciences (see Table 3).

The most common response, through both avenues of the program, was something in the physical sciences (47% at SMM and 48% traveling), including geology, physics, chemistry and kinetics. Less than a third (28% and 30%) of the visitors mentioned a life science, citing nature, biology, and wildlife. Just over one quarter (26% and 29%) of audience members emphasized that the show was about history or the origin of objects. A little more than one tenth (15% and 13%) mentioned social sciences, like anthropology. Nearly one fifth (19% and 16%) were unable to name a related science or suggested that the show lacked a science message. In total, just under a quarter (24%) of the visitors interviewed at the museum did not identify a specific type of science conveyed through the show. Of the traveling program audience, less than a fifth (14%) did not identify a specific science of note in the show. A set of responses is available below to give an impression of the types of responses to this question.

Table 3: Types of Science Identified*

	SMM (n=144)	Traveling (n=69)
Physical science	47%	48%
Life science	28%	30%
History/Origins of the objects	26%	29%
Social science	15%	13%
Life science – object only	8%	10%
Physical science – object only	6%	9%
Social science – object only	0	6%
Unsure/No science/Other	19%	16%

*Some visitors gave more than one response.

Science Represented Examples

Physical Science

- Lots of atomic stuff - what affects them. Fossils.
- Chemistry. [3]
- The airplane aviation, the cell phone, minerals and recycling.
- Basically the motion of the pitcher, the cost of things. How the price of the plane doubled over time.
- The plane. The physics of the pitcher in the Twins game and the transfer of energy from larger to smaller objects.
- Metals, technology.

Life Science

- Life science of the walrus.
- Food prep and the changing of the meat by what they feed the animal.
- Biology. [3]
- Nature, cooking.
- Well, let's see. Environmental biology with the pine, bird brains.
- How eyes see things; changes in pork, egg size, additives in pig food; wolves in MN; DNA growth, bones; stretchiness.

History/Origins of objects

- History of objects, I don't know.
- History. [10]
- The science was origins of everyday objects.
- Origins of things, history.
- Interesting facts that I never knew, and lots on fun history.
- Objects from around MN. Lots of great facts.

Social Science

- Economics.
- Culture.
- Architecture with the French Curve.
- You could say anthropology because of the kid coming from North Korea.

- More social science. What people keep and why they keep them. Thermo-luminescence dating as opposed to carbon dating.
- It covered history of animals, culture and various objects. It covered their progression and our present use of them.

Life Science-Object Only

- The tusk.
- Bacteria in Badger Balm.
- Animals.
- The food.
- Dogs, doctors.

Physical Science-Object Only

- Prehistoric rocks, the plane.
- How big the plane was. Fossils.
- Paper.
- Periodic table.

Unsure/No Science/Other

- I don't know. [5]
- Didn't see it in the Homer Hankie.
- Science related to belonging.
- Math.
- Touched on nearly every aspect. Wonderful.
- I was late coming, so I missed part of the show.

Museum visitors were asked their level of interest in science on a scale from 0 to 10 (0 is “No interest” while 10 is “Extreme interest”). Museum visitors were more likely to identify more fields of science (ie, biology, geology, etc) being portrayed through the program if they had a higher interest in science (7-10 on a scale of 0-10). Out of the visitors who identified their science interest (n=138), 79% had high interests in science. Half (50%) of the high science interest visitors were able to describe one or more physical sciences in the presentation, while only a third (31%) of the low science interest visitors were able to do this. A little less than a third (30%) of the high science interest visitors identified one or more life sciences, whereas only one tenth (10%) of the low science interest visitors did this. Social science identification did not seem to vary between high and low science interest groups. The traveling program survey did not include a question about audience members’ interest in science, so this information could not be generated for the traveling portion of the program.

Suitcase Science Findings From the Museum

Program Enjoyment

Museum visitors discussed what they thought the most enjoyable aspect of the show was. Over half (55%) said the acting was the most enjoyable part. One third (34%) said they most enjoyed the objects and their history or science. One tenth (11%) liked the audience participation the most, and the remaining visitors (8%) gave general praise about the show. See below for a selection of representative responses to this question.

Table 4: Most Enjoyable Aspect of Museum Program (n=139*)

	Percent of visitors
The acting	55%
The object's history or science	34%
Audience participation	11%
General praise	8%

*Some visitors gave more than one response.

Enjoyable Aspects of Museum Program Examples

The acting

- I liked when he talked about the airplane he was the airplane.
- The acting. The kids love her.
- Watching my daughter be amused by the different voices of the actor.
- How she did different voices, for each of the objects. I liked that.
- It was funny that the actor would do different voices and how animated he was.

The objects' history or science

- The history, the information. Enjoyable stories. This was the third time we've seen it and it's different every time.
- The paper and the tusk, good history and fun.
- It's a cute concept and it gives you the idea that there's a story about everything.
- Just seeing the different objects. It wasn't a single topic - there were lots of stories to keep me engaged.

Audience participation

- When I got to pick the clarinet. And the cookbook was funny too!
- Crowd interaction and being able to pick the objects.
- Getting kids up on stage. Allowing them to direct the show in a way.

General praise

- Probably just the adorableness of it.
- Really creative idea.
- The fact that the kids enjoyed it. They got excited about it. I don't think the kids understand all that he was doing though.

Show Content

Objects Represented

By April, 2011, the theater department had created science-based stories for 35 objects. Not all actors knew all 35 shows, so they only worked with the objects they knew. During each show, six to eight objects were displayed and children from the audience picked the objects to be presented. The actors performed the stories of three to five objects at each show. At the end of the show, visitors were asked to recall which objects the actors talked about. Evaluators tried to interview visitors who saw the majority of the show. Half of the visitors (53%) recalled three objects, 32% named four or five objects that were performed, and 15% recalled fewer than three objects.

More visitors (49%) saw the model plane than any other object (see Table 5). The other commonly reported items were the cookbook, ceramic pot, and piece of pine wood. Some objects were rarely recalled as being seen, like the watch fob and picture.

Table 5: Objects Visitors Recall Seeing (n=144)

	Visitors
Model plane	49%
Cookbook	32%
Ceramic Pot	25%
Pine wood	22%
Fossil (Rock)	18%
Blanket	17%
French curve	15%
Paper Sample Book	15%
Silver pitcher	12%
Chickadee Figurine	11%
Pheasant	10%
China set	8%
Music box	8%
Badger Balm	8%
Homer Hankie	7%
Aviator Glasses	5%
Geisha Doll	4%
Cell Phone	3%
Bowling Card	<1%
Watch fob	0
Picture	0

Surprising Content

Evaluators asked visitors if they were surprised by anything the actor said in the show; a little less than three fifths (57%) of the visitors answered affirmatively and reported what surprised them. Six visitors also volunteered reasons why they weren't surprised.

The cell phone stands out as the most surprising object (see Table 6 below). Four of the five people who saw it mentioned something surprising about it, usually concerning the rare minerals that are necessary to create cell phones. The geisha doll also stood out to those who saw it; four of the six visitors who saw it were surprised by the lead paint the geishas used. The silver pitcher is a little more remarkable in that more people saw it (17 visitors) and half of them thought that its properties were surprising (47%). Two fifths of the numerous visitors) that saw the cookbook (39%, n=46) were surprised by it, saying that they didn't know that Betty Crocker was not a real person and that they'd had no idea that the pork recipes had changed. Only 14% of

the visitors who picked the most popular object, the model airplane, were surprised by what they learned. Seventeen visitors remarked on general aspects of the show that they found surprising; a collection of their responses and the rest of the audience’s responses to this question are included below.

Table 6: Surprising Content*

	Visitors**
Cell phone (n=5)	80%
Geisha doll (n=6)	67%
Silver pitcher (n=17)	47%
Cookbook (n=46)	39%
French curve (n=18)	39%
Badger Balm (n=12)	33%
Silly Bandz (n=3)	33%
Pheasant (n=16)	31%
Walrus tusk (n=15)	20%
Chickadee figurine (n=16)	19%
Fossil (Rock) (n=26)	19%
Model plane (n=70)	14%
Clarinet (n=18)	11%
Homer Hankie (n=11)	9%
China set (n=12)	8%
Pine wood (n=32)	6%
Ceramic pot (n=36)	6%
Paper sample book (n=21)	5%
Blanket (n=25)	4%

*Only those objects that were mentioned as surprising are included. “n” represent the total number of people who saw the object.

**Some participants gave more than one answer.

Surprising Content Examples

Model plane

- Going and getting the baby, surprising because it was personal.
- That the 747 was made in 1960 or so.
- Different thoughts with the airplanes and local information. It's fun.
- That the wingspan of the 747 is almost the same as the length.

Cookbook

- The pigs surprised me. How in the Midwest they used to be more fat but then they added stuff to their food to make them skinny.
- I didn't know there was science in a cookbook.
- I didn't know the lady who wrote the cookbook was from MN.

- Betty Crocker; didn't know she wasn't a real person.

Walrus

- How much the walrus ate - how many clams.
- Walrus tusk being a game.
- Walrus ate 4000lbs of clams!

Chickadee figurine

- The bird one, too. I didn't expect that the bird would expect you to feed it continuously.
- That birds don't keep their memories.
- I didn't know about sparrows being in an invasive species.

Fossil (Rock)

- Yeah! I didn't know that Minnesota had a low-lying sea that spanned quite far.
- That the fossil was from Minnesota.
- The fossil one, that all the soft parts went away and not the bone, because it should all go away.

Cell phone

- I didn't know about the rare minerals in the cell phone. It's good to know because most people don't know how important it is to recycle the cell phones.
- A little bit about the cell phone, rare resources.

Geisha doll

- Lead was Pb in periodic table.
- The lead poisoning stuff about geishas.

Silver pitcher

- Didn't know the pitcher was going to throw up water!

I was surprised that silver kills bacteria.

French curve

- He said the French curve was used in a lot of things that I hadn't known about. I'd never seen one.
- That the French curve was used on Eiffel Tower and Arch de Triumph.

Badger Balm

- When he talked about the lip balm - about the party for the bacteria.
- I can't believe bacteria helps us digest things!

Pheasant

- About how when the bird came from Europe it carried germs that can kill livestock.
- I didn't know pheasants were an invasive species.

Clarinet

- The clarinet surprised me; that it was 100 years old. I didn't know plastic was that old, and I have a wooden clarinet. I guess plastic was just more desirable back then.
- About the formaldehyde in the plastic and how to tell it by smelling.

Pine wood

- I didn't know about the storm that knocked down all the trees.
- And that the tree took fifty years to develop, that they grow so long.

Ceramic pot

- I've heard about carbon dating, but didn't know how they date inanimate objects.
- I thought the dating of the vase was surprising. I didn't know that.

Silly Bandz

- It was interesting, about the silicone.

Homer Hankie

- That the Twins won - I thought they lost!

China set

- The ceramics in Japan.

Paper sample book

- How the paper got recycled.

Blanket

- That the blanket came from Guatemala. Although an object whisperer doesn't exist as she claimed it did.

General Comments about Surprising Content

- The jackknife thing, I'm not sure what you're trying to do there.
- It was fun to hear the personal story behind the model object and hear a personal history of a person in Minnesota.
- I don't like to hear the words "shut up" in a show that is for kids. We try to reinforce we shouldn't use that with each other. It was a bit more for an older crowd. The kids didn't seem to understand the jokes so much.
- How she presented it. How it possessed her. That was really unique.

Explanations of not being surprised

- No, we've seen it before.
- I found a lot of it interesting, but not surprising.
- It was all stuff I knew for the most, but I know my kids were learning.

Connections to Content

Visitors commented on the connections between the objects and their lives. Over four fifths of visitors (87%, n=142) were able to describe a personal connection to at least one of the objects they saw performed. A little less than one tenth (6%) described a general connection to the objects because they were from or connected to the local community, while 1% observed that they connected with the fact that the show was using everyday objects.

The most connected-to object was the paper sample book, with 81% of the visitors who saw it performed mentioning that they use paper in their daily lives (see Table 7). The cookbook also stood out in visitors' minds; three quarters (74%) of the many people (n=46) who saw the cookbook described a connection to it – either because of a connection to cooking in general, or a connection to that cookbook. A little less than half (47%) of the visitors who saw the model plane described a connection to it – mostly a connection with previous flying experiences.

Table 7: Visitor Connections*

	Visitors**
Paper sample book (n=21)	81%
Cell phone (n=5)	80%
Cookbook (n=46)	74%
Silly Bandz (n=3)	67%
Badger Balm (n=12)	58%
Aviator glasses (n=7)	57%
Pine wood (n=32)	56%
Homer Hankie (n=11)	55%
Clarinet (n=18)	50%
Model plane (n=70)	47%
French curve (n=18)	44%
Fossil (Rock) (n=26)	42%
Music box (n=12)	42%
Blanket (n=25)	40%
Geisha doll (n=6)	33%
Chickadee figurine (n=16)	25%
Pheasant (n=16)	25%
Swiss Army Knife (n=12)	25%
Ceramic pot (n=36)	22%
Walrus tusk (n=15)	20%
Wolf stuffed animal (n=6)	17%
Silver pitcher (n=17)	12%
China set (n=12)	8%
Everyday objects (n=142)	8%
Local community (n=142)	6%
Nothing (n=142)	13%

*Only those objects that were mentioned as connecting are included.

**Some participants gave more than one answer.

Visitor Connections Examples

Cookbook

- Cooking, everyone cooks.
- And the cookbook, because I've got an old one and the pork recipes probably aren't good anymore.
- The story about the pork and cooking was interesting. I've heard that before though.
- My mother has a Betty Crocker Cookbook.

Pine wood

- The log. I was there in that storm in 1999.
- We were in a snowstorm.
- The white pine - I've been to the Boundary Waters.
- The white pine is native to where my parents grew up. North of Hinckley and Duluth.

Model plane

- Diversity of cultures - travel.
- That Boeing took back kids from South Korea. My cousin is adopted from China and came on a plane. It was a funny reference so we both smiled [she sat next to him during the show].
- My dad is a pilot.
- I've been on a plane. I have model airplanes.

Fossil (Rock)

- I look for fossils.
- Always interested in paleontology.
- Rock - I used to teach 4th grade about trilobites.
- The stone was found by a student where I work.

Blanket

- The blanket - I didn't know the blanket was from Guatemala. I was expecting Thailand or Hmong.
- I weave, so the blanket did.
- The blanket was interesting because we have some wall hangings and textiles.
- Blanket was interesting, it showed a person's culture, Cecilia [one of the children] is an artist and likes to draw pictures of our culture.

Paper sample book

- And I use and make paper, so the paper book.
- Paper connects to reading and writing.
- I use paper in school!

Badger Balm

- We use lotions and balms, and I worked at a dentist so we sterilize.
- I put on lip balm almost every day.
- The lip balm-gross! I won't be sharing it anymore.

Clarinet

- I have a clarinet.
- Musical instrument, knowing it can be owned by so many people.
- Polymers, I see in my occupation.

French curve

- French Curve; we've seen Eiffel Tower and Arch de Triumph.
- I'm a graphic designer, so the French curve and paper remind me of school.
- I use stencils, like French Curve, a lot to design things. Use other objects not make games out of them.

Ceramic pot

- And I knew about carbon dating, I just didn't know you couldn't use it on things that hadn't been alive. Everybody owns a pot.
- We've been to Africa, like where the pot's from.

- I like to travel. I like different cultural things. The archaeology.

Cell phone

- We have cell phones.
- At home I have a phone; it's an emergency phone, but I can do what I want with it.

Silly Bandz

- We have Silly Bandz.
- I have Silly Bandz.

Aviator glasses

- The glasses: we all wear glasses.
- I sometimes put my sunglasses on and look at the sun too long.

Homer Hankie

- I have a homer hankie.
- Our grandson is an avid Twins fan, so this was just made for him. He'll remember this the rest of his life.

Music box

- Sophia (my daughter) has a music box.
- The music box was a good classical object. Music boxes have been around for thousands of years.

Geisha doll

- Lead. We need to be careful.
- China doll because grandpa went to Japan and brought a doll home.

Pheasant

- My dad hunts. We have pheasants in our house.
- I've seen pheasants in the woods where we used to live.

Chickadee figurine

- Chickadee-we are bird watchers.
- The birds. We've got bird feeders at home, and once you start feeding them you have to keep doing it.

Swiss Army knife

- It's all practical stuff. I love MacGyver.
- Well, I use a Swiss Army Knife quite a bit, actually.

Walrus tusk

- Have seen walrus tusks.
- We play cribbage.

Silver pitcher

- I use silverware, not pitchers though, but now I want one.
- I like the silver pitcher because I study alternative medicine.

Wolf stuffed animal

- I really do like wolves, like music.

China set

- I've seen something that's said it was made in occupied Japan.

Everyday objects

- Everyday things that we use, put a new perspective on them.
- You touch those same materials everyday.
- Everyday objects. You don't think of them in a science context. Makes you think about science. Everything has science.

Local community

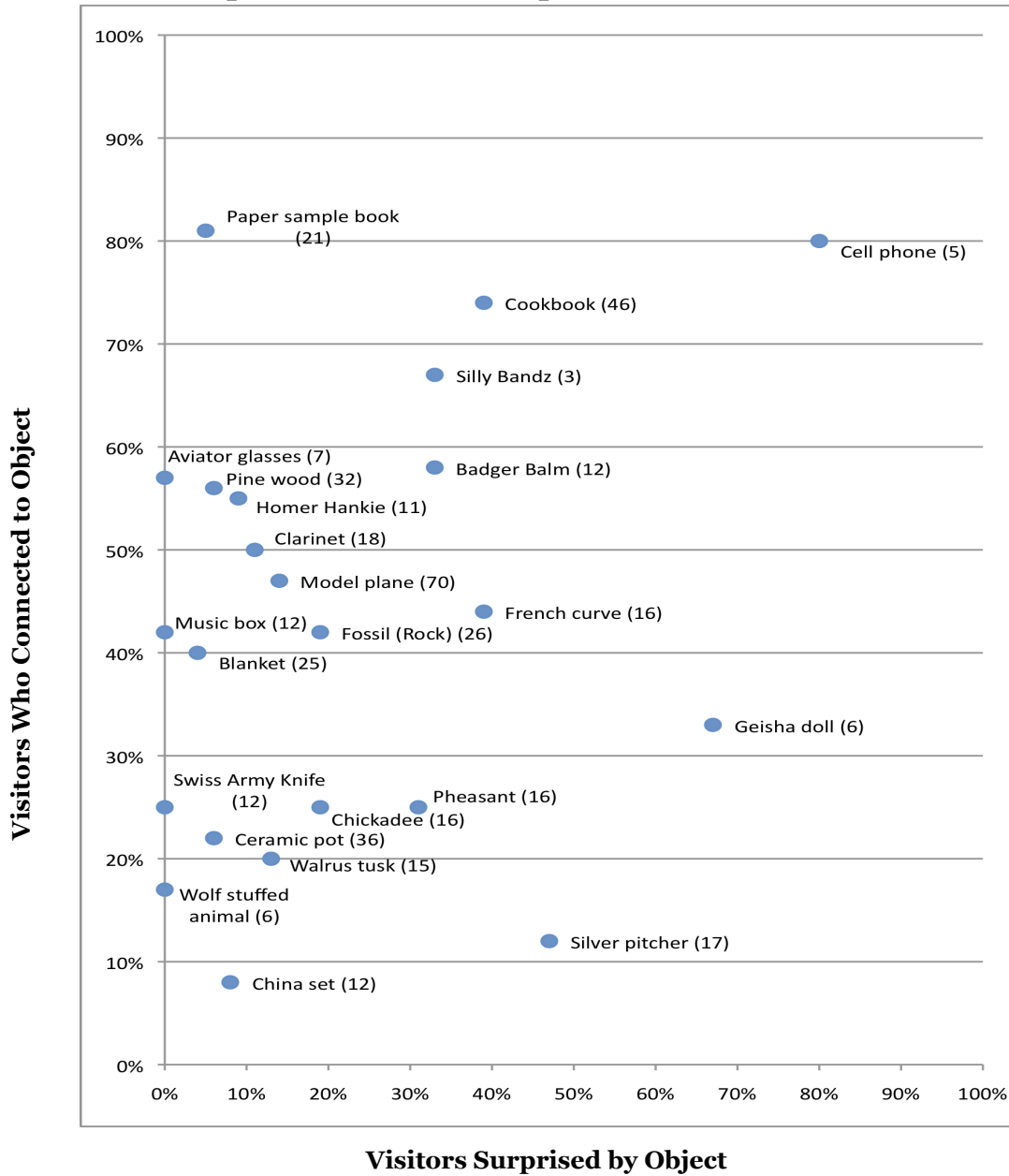
- Fun to hear they [objects] are all from Minnesota.
- Living in Minnesota, a lot of it related!
- Pine and fossils connected to local community. The actress did a good job of connecting the objects to the community.
- Chris [the owner of the cell phone] went to Morehead State and I grew up in Morehead.

Nothing

- None really did.
- Not sure.

The following chart shows the relationship between the percentage of visitors surprised by an object and the percentage that described a connection to it (please note that some visitors may not have been both surprised and connected to an object). The chart is included to help interpret the overall performance of each object. As before, each percentage is out of the number of people who saw that object – in parenthesis after the object title.

Chart 1: Relationship Between Visitor Surprise and Connection



Visitor Perception of Science Live Theater Shows

Half of the visitors (48%) had previously seen a Science Live theater show at the museum. Those who had seen a previous show answered how Suitcase Science was different than the other shows they attended. A little less than half (46%) of the visitors said that the topic of the show was different (see Table 8). A little less than one fifth (16%) thought the show was less of a demonstration and had more acting thought the show had either more history or less science than other shows. Other visitors said the show was more abstract (6%), less enjoyable (12%), or that it wasn't different (9%). See below for a selection of the responses to this question.

Table 8: How Suitcase Science is Different From Other Shows (n=69*)

	Visitors
Different topic	46%
Less demonstration/ More acting	16%
Less science/More history	16%
Less enjoyable	12%
More abstract	6%
Not different	9%

*Some visitors gave more than one response.

Suitcase Science Difference Examples

Different topic

- Name is catchy - it appeals to me more than "Surface Area" but less flashy. This presented more diverse scientific topics.
- More about objects and the other shows made you think more about scientists with lab coats and this was people telling you about objects.
- More easily related to. The other one was "flashy" with bubbles, etc.
- I don't know. I liked it less. It was the same thing over and over and the other ones are about different things and different things happen.

Less demonstration/More acting

- Others are more of a demonstration. This was more narrative.
- The Fire Tornado [Triangle] one was more lab-related.
- It was more engaging. He catches you and keeps you listening.
- Other ones have shown experiments (cryogenics). Saw one last year and she went through condensation. She had a lab coat on and glasses. This was more of an acting show and the other was more of chemicals.

Less science/More history

- It was more history than science.
- Yeah, it didn't seem as heavy science-y. It was more conversational. Relatable.
- It's not as much of a "how to." The other ones show the steps that cause something to happen, and this one is just more historical and more for fun.

Less enjoyable

- More boring, this one isn't as catchy or flashy.
- This show didn't incorporate things for young ones; in cryogenics, they get to see things break apart.

- The humor works on different levels for other [shows], a more broad range of ages than this one.

More abstract

- The other was more concrete, my kid could see the effects of cold on objects. This show was more abstract.
- It was more imagination.

Not different

- It's not talking about ice (the last nitrogen show). It was about the same - liked them both.
- I can't remember.

Repeat Attendance

Evaluators asked if visitors would consider viewing another Suitcase Science show. During early shows, evaluators asked visitors if they would view a show later in the day; during late shows, visitors were asked if they would view one during their next visit. Visitors were more likely to consider viewing another Suitcase Science show during their next visit; nine tenths (88%) of those asked answered affirmatively to this question. Two fifths (42%) of the visitors who were asked about viewing a show later in the day answered affirmatively (see Table 9). Half of the children surveyed (52%) were willing to come back later in the day to see the show again, and almost all of the children (93%) said that they would come see the show again during their next museum visit.

Table 9: Willingness For Repeat Viewings*

	Total Visitors	Children	Adults
Later in the day	42% (n=77)	52% (n=25)	36% (n=50)
During the next visit	88% (n=126)	93% (n=40)	83% (n=83)

*Some visitors were asked both questions.

Suitcase Science in Communities Around the State

Unlike the museum run of the program, the traveling portion of Suitcase Science did not allow for the same level of depth in data collection. While the museum version allowed for evaluators to interview visitors, the traveling program required the use of surveys to collect as much data as possible for each show. This means that some responses were not as well

Show Content

Connections to Content

Traveling program attendees were asked how any of the objects connected to something in their life. Participants identified many of the objects that were presented: one fifth of visitors (22%) named a connection with the cookbook, 13% mentioned the model plane and 8% talked about the cell phone. Other objects that visitors connected to can be found in the table below (see Table 10). One fifth (20%) offered other positive responses about connection that were not specific to a certain object. Similar to the museum program, a number of audience members related to the show through the connection of the objects to other everyday objects or the fact that some of the objects were from their local community.

Table 10: Audience Connections*

	Visitors**
Cell phone (n=9)	56%
Cookbook (n=46)	30%
Silly Bandz (n=12)	25%
Paper sample book (n=16)	19%
Chickadee figurine (n=22)	18%
Fossil (Rock) (n=13)	18%
Fiber art (n=11)	18%
Model plane (n=51)	16%
Flashlight (n=17)	16%
Silver pitcher (n=24)	13%
Guitar (n=22)	14%
Clarinet (n=16)	13%
Sneaker (n=8)	13%
Watch fob (n=8)	13%
Aviator glasses (n=17)	12%
Blanket (n=36)	11%
Wolf stuffed animal (n=18)	11%
Locket (n=21)	10%
Weiner dog (n=21)	10%
Geisha doll (n=10)	10%
China set (n=11)	9%
Swiss Army Knife (n=14)	7%
Walrus tusk (n=47)	2%
Everyday objects (n=64)	11%
Local community (n=64)	3%
Nothing (n=64)	6%

*Some participants gave more than one answer.

**Only those objects that were mentioned as connecting are included. “n” represents the number of people who saw the object.

Personal Connection Examples

Cookbook

- The Betty Crocker cookbook is one I own (three different editions) and my mother owned a 1950-something edition.
- Betty Crocker Cookbook was my first cookbook when I was married and didn't know how to cook.
- Cooking - need to change recipe.

- My mother had that Betty Crocker Cook book.
- Related to blanket, glasses, cookbook - I have some older ones, and it's interesting how farming trends/availability of food changes to what people demand.

Model plane

- The airplane story actually told a story about the first company that I flew with.
- I grew up by an airport - have taught many of these subjects and am amazed at the way the many aspects and years development of an object were told to us.
- Airplanes.

Cell phone

- Interesting to hear how a cell phone and cookbook such simple items have so much more to them.
- Cell phone is used in everyday life.
- Teaches us to recycle our phones.

Blanket

- The baby blanket reminded me of my own blanket.
- Related to blanket, glasses, cookbook - I have some older ones, and it's interesting how farming trends/availability of food changes to what people demand.

Chickadee figurine

- Great to know where all the different things came from, loved the facts. Want to build a birdhouse!
- Chickadees are something we see often.

Silver pitcher

- I had no idea silver was antibacterial!
- Cookbook, silver pitcher, guitar, were things I've used.

Silly Bandz

- My children really like silly bands.

Paper sample book

- The "Paper." I'm a writer.

Guitar

- The Alvarez guitar is the same name as my last name.

Aviator glasses

- My sister has glasses, and I never knew that kind of stuff.

Wolf stuffed animal

- My daughter's favorite was the wolf.

Clarinet

- We saw plastics in many of the objects that we use every day.

Locket

- Local items, I [heart] book, daughter [heart] jewelry, use paper everyday.

Weiner dog

- I lived with the dog.

Fiber art

- I am a friend of the fiber artist. I know the owners of all the objects presented.

Geisha doll

- Dolls.

Fossil

- My kids loved the rock section - they have a rock collection.

Swiss Army Knife

- I collect Swiss Army Knives.

China set

- The teapot.

Walrus tusk

- The walrus. [Have you read about walruses?] I think so.

Flashlight

- Use them, i.e. flashlight, cookbook.

Sneakers

- Sneakers -- comparison to human biology and bones.

Watch fob

- Watches.

Everyday objects

- Familiar objects all.
- The objects were things familiar to everyone. Almost everyone has seen the objects, even if they haven't used them.
- Told me that so many of my own objects have a story to tell.

Local community

- Local items.

Nothing

- None. [3]
- No.

Science and SMM

Accessibility of Science

Visitors were asked in what ways, if any, did the show help make science more accessible or understandable? A third (34%) of visitors thought the science became accessible through the details shared during *Z, the Amazing Object Whisperer* (see Table 11). A slightly smaller group (29%) felt the science came through because it was fun or entertaining. Both the use of common or personal items and the skill of the performer were identified by just under a quarter (22%) as helping make the science accessible. See below for a sample of responses to this question.

Table 11: How Suitcase Science Made Science More Accessible (n=65*)

	Visitors
The informative/detailed presentation	34%
That it was fun/engaging	32%
By using common/personal items	22%
Through the skill of the performer	22%
Negative response	3%

*Some participants gave more than one answer.

Accessibility of Science Examples

The informative/detailed presentation

- Reminder of old knowledge presented in a new way. Process may lead to seeing the everyday world in a more insightful manner.
- Telling about it. It's about science. It has more science than school!
- It explained some of the history and materials that go into the objects.
- Very good background histories!

That it was fun/engaging

- The presentation was so fun it makes learning facts very enjoyable and memorable.
- I felt it made science fun and easy to understand.
- It was fun!

By the use of common/everyday/personal items

- Science in everyday objects.
- It made the kids think about science in a different [way].
- Related to us by telling how everyday people connected to the object.

Through the skill of the performer

- I love the characters telling you what they do and the pride they exhibited, very relatable.
- I think that the storytelling format is helpful to teach children rather than a poster listing the same info.

Negative response

- No.

Connection to SMM

Visitors to the Suitcase Science show were asked if they had visited the Science Museum of Minnesota in the past. Over three quarters (77%) of visitors reported visiting SMM in the past. And did seeing the Suitcase Science presentation make a visitor consider visiting SMM? Of the sixty-eight visitors responding to this question, over four fifths (87%) reported that it did. Within that group, 49 visitors offered reasons for why Suitcase Science made them want to visit the museum. Just over a third (37%) reported that the entertainment and enjoyment of seeing the show made them want to visit the museum (see Table 12). A quarter (25%) of visitors reported a new or renewed interest in SMM. Other aspects of the show visitors identified include the innovative use of everyday items, the way information was conveyed through the show, and the excitement and engagement of the actors in the show interested audience members in visiting the museum.

Table 12: Suitcase Science and Reasons for Visiting SMM (n=49)

	Visitors*
Show in general/entertaining	37%
New/renewed interest in science/SMM	25%
Using common/everyday items	18%
Information from show/learning	16%
Actors	12%
Affirmative response	2%

*Some participants gave more than one answer.

Audience Interest in Coming to SMM Because of Show Examples

Show in general/Show was entertaining

- It was fun and entertaining.
- I'd love to bring the grandchildren. They'd love it. It's entertaining and fun.
- I love that they reach out to the community other than at the museum.
- I hope that the museum would have live shows like this one.

New/renewed interest in science/SMM

- Of course. We have let our membership slide, but will renew today.
- Stirred up curiosity, reminded me of the resource.
- We are members and enjoy many exhibits there, and the staff.
- Reminded me that it has been a LONG time since I have been there.

Show approach using common/personal items

- The innovated way science was taught.
- How they are talking through objects.
- Seeing more objects and their stories.

Information from show/Learning

- Learning more about MN history and artifacts.
- Good information about common items.
- You had a lot of facts I didn't know.

Show presenters

- Talented presenter and creativity.
- The presentations were excellent!

Affirmative response

- Always.

Community Participation

Visitors to the show were asked if they participated in one of the community workshops at the onset of the Suitcase Science program. Out of sixty-eight visitor answers, just over a tenth (12%) said they had been participants in a local workshop. A few additional visitors provided written comment that they knew the person who had contributed one of the items that was presented during the show.

Audience members were asked if they intended to visit the exhibit about Suitcase Science that is on display at their local library. Nearly all (93%, n=67) reported that they intended to visit the exhibit.

Conclusions

Suitcase Science is a popular show at SMM and in communities around Minnesota. It showcases humorous stories that make science accessible for audience members, no matter their background. It also seems to support museum attendance, from SMM visitors that want to see the show again to people around the state being reminded about SMM's high quality programs and exhibits. This evaluation found several factors that point to Suitcase Science's success at the museum and beyond.

While 30-49 year olds made up a large part of the responding audiences, there were a number of children in the audience for presentations outside of the museum. While only 19 children were surveyed, over 65 children were in attendance at shows across the state. There were a few shows that were held at locations that did not support younger audiences (for example, a nursing home). One tenth of the attendees at the traveling shows had participated in one of the local workshops that helped generate the objects and their stories.

Interest and enjoyment ratings were high across the board, but traveling show attendees gave higher ratings than SMM visitors. Most of the SMM visitors and traveling show attendees remarked that they felt a connection to the cell phone and the cookbook because they were objects that these people used on a daily basis. Only SMM visitors were asked what objects they found surprising, and the cell phone, geisha doll, and silver pitcher were the highest rated.

Audience members identified numerous fields of science in the show. Physical science (as opposed to Life and Social science) was the most commonly reported, with many visitors saying the show featured "chemistry," "physics," or "geology." Only a handful of SMM visitors found no science content in the show. These visitors tended to focus on the show's presentation style or its use of local, historical and everyday objects. About one fifth of the traveling show attendees said that Suitcase Science made science concepts more accessible by telling informative stories through everyday objects.

SMM visitors were also asked how Suitcase Science is different from other shows at the museum. Most visitors commented that it was a different topic, but others noted that there was more history and acting involved in Suitcase Science and that it was less of a demonstration and less science-oriented. In fact, over half of the audience at SMM shows thought that the acting was the most enjoyable part of Suitcase Science. Almost all of these visitors said they would come back to see Suitcase Science the next time they were at the museum.

Most of the traveling show attendees had visited the museum in the past, and almost all of them said that Suitcase Science made them interested in visiting the museum in the future. The most often cited reason for this was because they found the show really entertaining. Almost all of the attendees said that they would visit the local exhibit at their community's library.

Clearly, Suitcase Science appeals to people for a variety of reasons, from the actor's wacky portrayal of each object's personality, to the depth of information that the stories provide about objects from Minnesota. It meets its goal of integrating communities around the state to create an exhibit and presentation that make science accessible for a wide range of audience members.

Demographics

Evaluators collected demographic information from 143 SMM visitors and 65 audience members of the traveling show. Two thirds (65% at SMM and 70% traveling) of the audience respondents were female. At the museum, nine tenths (92%) came in groups of adults and children; the remaining visitors came with other adults (6%), or alone (1%). Across both shows, half (50% at SMM and 54% traveling) of the visitors were between the ages of 30 and 49. See Table 13 below for a full report of visitors' ages.

Table 13: Age of Visitors

	SMM (n=140)	Traveling (n=65)
0-5	1%	0*
6-8	4%	2%
9-12	23%	6%
13-17	3%	6%
18-20	1%	2%
21-29	4%	8%
30-39	24%	20%
40-49	26%	20%
50-59	5%	14%
60-69	9%	9%
70-79	1%	8%
80 and older	0	6%

*Visitors under the age of 6 were purposefully not surveyed during the traveling program.