

# Outdated Exhibits

## Research Report

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## EXECUTIVE SUMMARY

This report presents visitors' perceptions of out-of-date and up-to-date exhibits at the Museum of Science, Boston. The purpose of this study was to learn about specific exhibits that visitors' view as outdated and any characteristics that influence visitors' opinions in this regard. For this report, data were collected in three stages between December 2009 and June 2010. Data from an exit interview, a prompted camera interview, and a post-refurbishment interview provide suggestions for the Exhibit Department to consider as they prioritize exhibits they plan to refurbish or replace.

The following evaluation questions guided the study:

- Which exhibits at the Museum of Science do visitors view as out-of-date and up-to-date?
- Which exhibits give visitors particularly positive or negative impressions of the Museum?
- What relationship, if any, exists between exhibits that are viewed as out-of-date and those viewed negatively?
- What characteristics are shared by the exhibits that are viewed both negatively and as out-of-date by visitors?
- Do the characterizations of exhibits differ between frequent and infrequent visitors?

Findings:

- *Introduction to Nanotechnology*, the Current Science and Technology exhibits, and *Beyond the X-Ray* are perceived as more up-to-date than other exhibits at the museum.
- *New England Habitats*, *Investigate!*, and *Birth* are perceived as more out-of-date than other exhibits.
- Familiarity, perceived age, and functionality were common reasons why visitors felt exhibits were out-of-date.
- Content, technology, and aesthetic appeal were frequently mentioned when visitors described up-to-date exhibits.
- Certain exhibits that were considered out-of-date were also liked by visitors.
- After the refurbishment of *New England Habitats*, there was a notable increase in visitors' favorable impressions of the exhibit.

Recommendations

- The Exhibit Department should continue to upkeep exhibits.
- Exhibits that were considered both out-of-date and not well liked are in particular need of immediate and complete refurbishment
- Smaller more frequent updates to exhibits could address visitors' interest in current content.

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## I. INTRODUCTION

The Education Division at the Museum of Science, Boston is developing a new strategic plan that will guide the refurbishment and development of permanent exhibits in the institution. This study was commissioned by the Education Division to help prioritize which exhibits should be refurbished or replaced, as well to identify what characteristics of exhibits lead visitors to think they are out-of-date.

This study built upon past work at the Museum of Science (MOS) that broadly examined visitor concerns. In 2006, a Research and Evaluation Department study commissioned by the Exhibit Maintenance Department compared the perceptions of visitor and exhibits maintenance staff as to which exhibits were broken and then made recommendations to improve the visitor experience (Kunz & Reich, 2006). For example, visitors were more likely than MOS staff to say partially functioning exhibits were broken. Visitors also discovered problems with computer-based exhibits more frequently than staff.

The Research and Evaluation Department has also worked in conjunction with the Visitor Services Department to monitor and code visitor comment cards to better understand visitor feedback (Reich & Kunz Kollmann, 2008). This study found that the areas for greatest concern for visitors included cleanliness and maintenance, in addition to monetary value, information availability, staff interactions, general quality, crowdedness, and content.

Beyond this comment card work, these departments have also collaborated on the Visitor Experience Monitoring project (VXM). VXM seeks to more accurately monitor the quality of visitors' experiences at the Museum of Science and, therefore, data is collected throughout the year. In particular, the comment card and VXM reporting highlighted that visitors do not always have a positive view of how up-to-date the Museum is. As a part of the analysis of VXM data for the 2010 fiscal year, visitor ratings of how up-to-date the Museum is were compared before and after several older exhibits underwent refurbishment. Despite the refurbishment of multiple exhibits, visitor ratings of how up-to-date the Museum is did not change (Lindgren-Streicher & Reich, 2011a). An additional analysis of VXM data for an audience segmentation study shed further light on visitor perceptions of how up-to-date the Museum is (Lindgren-Streicher & Reich, 2011b). This study found that sightseeing families, who were less likely to be members and were less likely to have visited the MOS recently, rated how up-to-date they found the Museum higher than fun-loving families and education-loving families, who were both more likely to be members and have visited recently. This suggests that visitors who are less familiar with the MOS, and visit it less frequently, are more likely to find the Museum up-to-date than those who are more familiar with the Museum.

Based in part on this previous work, the current study provides a broad picture of visitor perceptions of specific exhibit galleries at the Museum of Science. These results are intended to help determine which exhibit refurbishment or replacement projects will have the largest potential impact on improving visitors' experiences at and perceptions of the Museum of Science.

The questions driving this study include the following:

- Which exhibits at the Museum of Science do visitors view as out-of-date and up-to-date?
- Which exhibits give visitors particularly positive or negative impressions of the Museum?
- What relationship, if any, exists between exhibits that are viewed as out-of-date and those viewed negatively?
- What characteristics are shared by the exhibits that are viewed both negatively and as out-of-date by visitors?
- Do the characterizations of exhibits differ between frequent and infrequent visitors?

## II. METHODS

### EXIT INTERVIEWS

The data for this study were collected in three stages, beginning with exit interviews in late 2009. Between December 29, 2009, and January 28, 2010, visitors were randomly selected to participate in an exit interview as they were leaving the Museum through the main turnstiles. One visitor from each group was asked to provide feedback, and the visitor was considered eligible for the study if he/she had finished visiting the exhibit halls for the day. The questions were intended to identify which exhibits were perceived as out-of-date or up-to-date by visitors, which exhibits were perceived positively and negatively, and what characteristics of the exhibits led visitors to categorize them as they did. A copy of the exit interview instrument can be found in Appendix A. Visitors were also asked to complete a demographic questionnaire that included questions regarding their gender, age, race/ethnicity, last visit to MOS, and membership status. The demographic questionnaire used for this study can be found in Appendix D.

413 people were approached as they exited the Museum of Science exhibit halls, and 112 surveys were conducted, for an overall response rate of 34%. During the interview, visitors were asked to recall which exhibits they had visited that day with the help of photo cards. Of the 112 interviews, 10 were completed by participants who only visited one exhibit, and as a result, questions about which exhibits were most up-to-date and most out-of-date were not asked. Moreover, two of the 112 interviews were not completed (participants terminated the interview early). These 12 were excluded from the exit interview analysis. It also should be noted that the *Theater of Electricity* was not included in the first 11 exit interviews.

The following exhibits were included in the exit interviews:

- *Birth*
- *Beyond the X-Ray*
- *New England Habitats*
- *A Bird's World*
- *Natural Mysteries*
- *Take a Closer Look*
- *Dinosaurs: Modeling the Mesozoic*
- *Intro to Nanotechnology*
- Wind Energy/Solar Energy exhibits
- *Making Models*
- *Virtual Fish Tank*
- *Innovative Engineers*
- Current Science & Technology exhibits
- *Mathematica*
- *Science in the Park*
- *Investigate!*
- *Lighthouse*
- *Living on the Edge*

## CAMERA INTERVIEWS

For the camera interview portion of the data collection, visitors were purposefully selected as they entered MOS, given digital cameras, and asked to photograph up-to-date and out-of-date exhibits. Only visitors who were entering the exhibit halls for the first time that day were eligible to participate. Furthermore, visitors were purposefully selected to ensure that the sample had a range in terms of the make-up of the visitor group, age, gender, and frequency of visit. Visitors were also screened for their intended length of stay at the museum to ensure that their group would complete their visit within a given data collection period. Evaluators used this purposeful selection method to elicit feedback from a broad spectrum of Museum of Science visitors. These eligibility requirements were determined by asking potential participants to complete a demographic questionnaire that included questions regarding their gender, age, race/ethnicity, last visit to the MOS, and membership status. During May and June of 2010, twelve of the visitors who were invited to participate in the study agreed to provide their feedback.

One visitor in each group who met the eligibility criteria and agreed to participate was given a digital camera in exchange for an adult photo ID. Both written and verbal instructions explained that they should take at least three photos of exhibits they felt were out-of-date and three photos of exhibits that they felt were up-to-date. Visitors were invited to take more photographs if they so desired, as long as they were able to finish in time to meet the evaluator at the designated hour and location. Upon completing the assignment, their photos were uploaded to a computer and sorted into out-of-date and up-to-date categories by the visitor with the assistance of the evaluator. Following the sorting of their photographs, visitors were asked to identify one photograph from the exhibit they thought was the most out-of-date and one photograph from the exhibit they thought was the most up-to-date and to explain their choices. Additional questions asked visitors to elaborate on their negative or positive reactions to the other exhibits they photographed. A copy of the camera interview instrument can be found in Appendix B. Upon completing the assignment, they were provided with a flash drive that contained all their photos and either two exhibit hall passes or a gift card to the Museum shop.

## NEW ENGLAND HABITATS INTERVIEW

The final round of data collection related to visitors' perceptions of outdated exhibits was specific to the *New England Habitats* (NEH) exhibit. A random sample of visitors exiting this exhibit during the data collection period were approached and asked to provide feedback on three brief interview questions and to fill out the same demographic survey used in the earlier stages of data collection. During this process, visitors were asked whether they felt that NEH was up-to-date, out-of-date, or neither, and to elaborate as to why they felt that way. Then they were asked to state whether they liked NEH, disliked NEH, or felt neutral about the exhibit. A copy of the interview instrument used for this portion of the study can be found in Appendix C. A total of 41 responses were collected during two hour sessions on June 16<sup>th</sup> and 19<sup>th</sup>, 2010.



## LIMITATIONS

Although the post-refurbishment interview of the *New England Habitats* (NEH) exhibit asked the same questions as the original exit interview, one limitation to this study is the fact that there was no pre-refurbishment data collection method that focused exclusively on NEH. Responses from the earlier exit interview were compared with those from the NEH post-refurbishment interview if visitors indicated that they had gone to NEH at some point during their museum visit. Thus, visitors who took the original exit interview were reflecting on their visit to the museum as a whole and not simply their time in NEH. However, trends were seen in the original exit interview data which could be compared with the NEH post-interview. The trends in the like/disliked category and up-to-date/out-of-date rankings especially point to an increase in positive visitor impressions after the refurbishment.

Another limitation pertaining to the evaluation instruments was the fact that the *Theater of Electricity* was not included on the first 11 exit surveys as an exhibit option. However, the *Theater of Electricity* was added to the remaining surveys, and ultimately this exhibit had the highest net score for most liked exhibit.

While other institutions can learn from the general themes that were noted for up-to-date and out-of-date exhibits within this report, the exhibits references are all specific to the Museum of Science, Boston. However, even though the results of this study are not generalizable to the larger museum world, they bring up issues that would be relevant for other institutions to consider when working on outdated exhibits.

Besides being museum specific, the results of this study are also time specific in regards to comments related to technology. Technology was often cited as a reason why exhibits were seen as out-of-date or up-to-date. Because technology is changing so rapidly, the exhibits' components which were seen as up-to-date at the moment might seem out-of-date in a short amount of time. However, some older computer-based exhibits, such as *Virtual Fish Tank*, were cited as up-to-date based on the technology present in the exhibit. Therefore, a limitation to this data is that visitors' perceptions to the technology used in exhibits, even recently refurbished ones, will always be changing.

## DEMOGRAPHIC INFORMATION

During each round of data collection, visitors were asked to complete a demographic survey to supplement their interview or survey. Full tables of the demographic data can be seen in Appendix E. In summary, the most prominent visitor age group for every session was between 35-44, and women outnumbered men across the board. The majority of visitors were Caucasian and held college degrees. Membership status and the frequency of visitors' last visits to MOS varied between data collection methods, as well as how often visitors had been to the Museum in the past two years.

### III. RESULTS AND DISCUSSION

#### 1. VISITOR REACTION TO EXHIBITS

##### *1.1 Some exhibits were more visited than others*

Data from the exit interviews clearly indicated that some exhibits were visited more frequently by the study participants than others. Participants were asked to identify which exhibits they had spent time in by sorting cards with photos of 19 exhibits into two piles: exhibits they had visited and exhibits they had not visited. These results can be seen in Table 1. The most frequently visited exhibit was *Mathematica* (52 of 100 respondents), followed closely by *New England Habitats* (48/100), and *Making Models* (48/100), which were tied in visitation rate. It is important to note that these three exhibits are all close to the Museum’s entrance and information desk. The least frequently visited exhibits were the Current Science and Technology area (19/100), *Innovative Engineers* (18/100), and *Living on the Edge* (16/100), which all received similarly low visitation rates.

**TABLE 1. Exhibits visited (n=100).**

	<b>Count</b>	<b>%</b>
Mathematica	52	52%
New England Habitats	48	48%
Making Models	48	48%
Dinosaurs	43	43%
A Bird’s World	41	41%
Theater of Electricity	40	40%
Science in the Park	40	40%
Virtual Fish Tank	38	38%
Natural Mysteries	38	38%
Birth	33	33%
Light House	31	31%
Investigate!	31	31%
Beyond the X-Ray	31	31%
Take a Closer Look	29	29%
Wind/Solar Energy	26	26%
Introduction to Nanotechnology	23	23%
Current Science & Technology	19	19%
Innovative Engineers	18	18%
Living on the Edge	16	16%

##### *1.2 Some exhibits are more and less liked by visitors*

During the exit interview, visitors were then asked to sort photos of the exhibits they had visited into three piles: exhibits they liked, exhibits they disliked, and exhibits about which they felt neutral. Table 2 presents these results. To gain a better understanding of how each exhibit was perceived by visitors, a net score was obtained by subtracting the percentage of

visitors who disliked the exhibit from the percentage of visitors who liked the exhibit. The most well liked exhibit, by far, was the *Theater of Electricity*, with a net score of 90.2. *Dinosaurs* (77.3) and *A Bird's World* (73.2) were also among the most well liked exhibits; however, their scores were markedly lower than the score for the *Theater of Electricity*. Visitors liked *New England Habitats* (35.4), *Investigate!* (34.4), and *Birth* (30.3) the least, with *Birth* having the lowest overall net score.

**TABLE 2. Exhibit like/dislike scores (n=100).**

	Net score	Like		Neutral		Dislike		Not visited count
		Count	%	Count	%	Count	%	
Theater of Electricity	90.2	37	90.2%	4	9.8%	0	0.0%	49
Dinosaurs	77.3	35	79.6%	8	18.2%	1	2.3%	56
A Bird's World	73.2	31	75.6%	9	22.0%	1	2.4%	59
Science in the Park	72.5	32	80.0%	5	12.5%	3	7.5%	59
Introduction to Nanotechnology	69.6	18	78.3%	3	13.0%	2	8.7%	77
Virtual Fish Tank	68.4	28	73.7%	8	21.1%	2	5.3%	62
Wind/Solar Energy	66.7	20	74.1%	5	18.5%	2	7.4%	73
Beyond the X-Ray	66.6	22	73.3%	6	20.0%	2	6.7%	70
Take a Closer Look	63.3	22	73.3%	5	16.7%	3	10.0%	69
Current Science and Technology	57.9	12	63.2%	6	31.6%	1	5.3%	80
Mathematica	56.6	38	71.7%	7	13.2%	8	15.1%	47
Innovative Engineers	55.6	12	66.7%	4	22.2%	2	11.1%	82
Natural Mysteries	55.2	26	68.4%	7	18.4%	5	13.2%	62
Lighthouse	48.4	19	61.3%	8	25.8%	4	12.9%	69
Living on the Edge	40.0	7	46.7%	7	46.7%	1	6.7%	85
Making Models	38.3	28	59.6%	9	19.1%	10	21.3%	53
New England Habitats	35.4	26	54.2%	13	27.1%	9	18.8%	52
Investigate!	34.4	19	59.4%	5	15.6%	8	25.0%	68
Birth	30.3	17	51.5%	9	27.3%	7	21.2%	67

### 1.3 Some exhibits are perceived as more up-to-date or out-of-date by visitors

In the exit interview, visitors were asked to categorize all of the exhibits they saw as either up-to-date, out-of-date, or neutral (neither up to nor out-of-date), as shown in Table 3. Once again a net score was obtained by subtracting the percentage of visitors who thought the exhibit was out-of-date from the percentage of visitors who thought the exhibit was up-to-date. *Introduction to Nanotechnology* received a very high net score (95.7), and was seen by visitors as the most up-to-date exhibit at the Museum. The *Current Science and Technology* exhibits also received a high net score (89.5) and was ranked as the second most up-to-date exhibit. *Beyond the X-Ray* received the third highest net score (67.7), although this score is notably lower than the high scores of the *Current Science and Technology* exhibits and *Introduction to Nanotechnology*. In contrast, visitors found *New England Habitats* to be, by far, the most outdated exhibit with a net score of -24.0. *Investigate!* (3.1) and *Birth* (6.0) were the second and third most outdated exhibits, respectively.

TABLE 3. Exhibit up-to-date/out-of-date scores (n=100).

	Net score	Up-to-date		Neutral		Out-of-date		Not visited count
		Count	%	Count	%	Count	%	
Introduction to Nanotechnology	95.7	22	95.7%	1	4.4%	0	0.0%	77
Current Science and Technology	89.5	17	89.5%	2	10.5%	0	0.0%	81
Beyond the X-Ray	67.7	25	80.6%	2	6.5%	4	12.9%	69
Virtual Fish Tank	60.6	27	71.1%	7	18.4%	4	10.5%	62
Theater of Electricity	59.6	29	69.1%	9	21.4%	4	9.5%	48
Wind/Solar Energy	59.3	19	70.4%	5	18.5%	3	11.1%	73
Take a Closer Look	58.1	22	71.0%	5	16.1%	4	12.9%	69
Science in the Park	56.1	27	65.9%	10	24.4%	4	9.8%	59
Dinosaurs	37.2	24	55.8%	11	25.6%	8	18.6%	57
Innovative Engineers	35.3	8	47.1%	7	41.2%	2	11.8%	83
Living on the Edge	31.3	7	43.8%	7	43.8%	2	12.5%	84
A Bird's World	30.0	18	45.0%	16	40.0%	6	15.0%	60
Lighthouse	25.8	14	45.2%	11	35.5%	6	19.4%	69
Making Models	24.4	19	39.6%	22	45.8%	7	14.6%	52
Mathematica	22.6	23	43.4%	19	35.7%	11	20.8%	47
Natural Mysteries	17.9	14	35.9%	18	46.2%	7	18.0%	61
Birth	6.0	14	42.4%	7	21.2%	12	36.4%	67
Investigate!	3.1	12	37.5%	9	28.1%	11	34.4%	68
New England Habitats	-24.0	11	22.9%	14	29.2%	23	47.9%	52

Visitors who took the exit interview were also asked to name the one exhibit they felt was the most out-of-date and the one exhibit they felt was the most up-to-date. As seen in Table 4, *New England Habitats* (17/100) received considerably more nominations for the most out-of-date exhibit than any other choice. However, *Making Models* (9/100), *Mathematica* (8/100), and *Birth* (8/100) also received several votes for the most out-of-date exhibit. There was no clear consensus when visitors were asked to choose the one most up-to-date exhibit. *Science in the Park* (14/100), *Introduction to Nanotechnology* (12/100), and *Theater of Electricity* (10/100) were the top three choices. Notably, four visitors felt that no exhibits were out-of-date.

**TABLE 4. Most out-of-date and up-to-date exhibits (n=100).**

	Most out-of-date Count	Most up-to-date Count
New England Habitats	17	2
Making Models	9	3
Birth	8	4
Mathematica	8	5
Science in the Park	7	14
Dinosaurs	7	3
Investigate!	6	3
Natural Mysteries	6	3
Virtual Fish Tank	4	9
Theater of Electricity	4	10
A Bird's World	4	5
None	4	0
Wind Energy/Solar Energy	3	4
Don't Know	3	1
Lighthouse	2	4
Innovative Engineers	2	1
Take a Closer Look	2	2
Living on the Edge	1	1
Beyond the X-Ray	1	6
Introduction to Nanotechnology	1	12
Other	1	1
Current Science and Technology	0	7

#### *1.4 Some out-of-date exhibits are liked by visitors*

Even though several exhibits were ranked as out-of-date, it is important to compare this data with whether or not these exhibits were also well liked. Favorite or iconic MOS exhibits that have been at the Museum for many years, for instance, may be seen as out-of-date but are, nevertheless, often enjoyed and liked by visitors. The following exhibits had a net up-to-date/out-of-date score below 50 but had a liked/disliked net score above 50. Thus, while these exhibits were seen as out-of-date, they were liked by visitors.

- *Dinosaurs*
- *A Bird's World*
- *Mathematica*
- *Innovative Engineers*
- *Natural Mysteries*

Whereas the exhibits listed below had both a net up-to-date/out-of-date score below 50 and a liked/disliked net score below 50. Therefore, visitors not only felt these exhibits were out-of-date but had a negative impression of them.

- *Lighthouse*
- *Living on the Edge*
- *Making Models*
- *New England Habitats*
- *Investigate*
- *Birth*

These lists indicate that there were two distinct groups of out-of-date exhibits; those which were viewed positively and those which were viewed negatively. Comparing these two groups gives a better understanding of how exhibits can be prioritized for refurbishment. When planning exhibit refurbishment or replacement, it is important to take into account both visitor preference for the exhibit overall and their perception of whether it is up-to-date or out-of-date. The exhibits that rank low with regards to visitor preference and are also considered out-of-date should be prioritized.

## **2. WHY VISITORS FIND EXHIBITS UP-TO-DATE OR OUT-OF-DATE**

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### ***2.1 Visitors cited familiarity and aesthetics of an exhibit as a main reason for its outdatedness***

Visitors were asked to explain why the exhibit they chose was the most out-of-date. In answering this question, visitors focused on the perceived age, lack of novelty, and appearance of the exhibit. Table 5 shows the reasons why visitors who took the exit interview felt exhibits were out-of-date. The most commonly cited reason why an exhibit was out-of-date was that it was an old or familiar exhibit (34/107). In fact, this response was cited more than twice as frequently as the fact that an exhibit looked old or worn (14/107), which was the second most common reason an exhibit was categorized as out-of-date.

TABLE 5. Reasons given for why exhibits were out-of-date (n=107).

Code	Count	Example Quote
It is an old or known exhibit	34	Not new stuff, same thing as always, also same thing that is in other exhibits.
Looks old or worn down	14	Looked the same as it did thirty years ago.
Exhibit is broken or missing pieces	9	A lot of the things are broken, we have been going to it for a while.
Activities were static or non-interactive	8	From a kid's point of view, interactive stuff is best, and <i>Mathematica</i> is more just looking at things.
There were no computers or technology or it was old	7	I don't think kids appreciated that kind of thing, they want technology.
Content was out-of-date	7	The cars were 10 and 20 years old.
Other out-of-date	6	It was cool to see animals but not a lot of information to go along with it.
No response	6	We thought they were all up-to-date.
Content was boring or uninteresting	5	Only because you know, you build a fish, ok that's cool but now what... something you only do once.
Don't know	4	I don't know.
Out-of-date in comparison to other exhibits	4	Just compared to the others.
Content was static	3	Update it a bit more, include newer science but still make it fun for kids.

Visitors who participated in the camera interview portion of this study agreed that old and familiar exhibits can start to feel outdated. For example, one visitor took a photo of *Dinosaurs* to illustrate an outdated exhibit and stated that *Dinosaurs* is the “same old, same old every time we come.” Her photo can be seen below in Figure 1. She went on to suggest “[m]aybe showing some more [of] the environment, a little more of an immersive feel to it as if you are walking through their actual environment” as something that might make this familiar exhibit seem less outdated.

A similar argument was provided by another visitor who participated in the camera interview when asked to comment on why she chose a photo of *A Bird's World* to represent an outdated exhibit. This visitor stated that “[I had s]een it before, [and so it was] not necessarily out-of-date but old to me.” Figure 2 shows the visitor’s photo of *A Bird's World*. These two responses point to the fact that some visitors deem certain exhibits to be outdated if they have not changed over time or if there is a high level of familiarity.

**FIGURES 1 and 2, Examples of visitor’s choices for outdated exhibits based on oldness/familiarity.**



***Dinosaurs***



***A Bird's World***

Camera interview participants, like those who completed the exit interview, also noted that exhibits which appear old or worn seem outdated. Figure 3 shows a visitor’s photo of *Mathematica* because as the visitor explained, *Mathematica* felt “[o]utdated because the exhibit can no longer fit information in a readable way... [the exhibit] needs to be expanded or updated, or get rid of some people... [it] looked crowded.” Another visitor expressed a similar opinion in regard to the exhibit *Making Models* and argued that “[t]he set up was so-so, not interactive, not bad but out-of-date. Lacked some sex appeal, decent, layout was dull.” Figure 4 shows the photo this visitor referred to when describing his choice for most outdated exhibit. Gauging from these specific camera interview examples and data from the exit interviews, the aesthetics of an exhibit can make a difference in whether or not an exhibit is perceived as outdated. More photos highlighting out-of-date exhibits that were taken by visitors during the camera interview can be seen in Appendix F.



**FIGURES 3 and 4, Examples of visitor's choices for outdated exhibits based on worn down or older appearance.**



**Mathematica**



**Making Models**

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### ***2.2 Additional reasons for why visitors felt exhibits were out-of-date***

Although aesthetics and familiarity were by far the most common reasons why visitors found an exhibit to be out-of-date, visitors provided several other justifications as well. For one, an exhibit's functionality also proved to be important to visitors when deciding whether an exhibit was up-to-date or not. Broken components or missing pieces made many visitors feel that an exhibit was out-of-date, whereas, had it been functioning properly, they might have categorized it otherwise. Data from comment cards also indicate that broken components or missing pieces affect how visitors view exhibits. Secondly, content was mentioned by many visitors as being an important factor that contributed to an exhibit feeling outdated. Certain exhibits were deemed out-of-date because their content was either not current or boring. As one visitor noted during the exit interview, "I know that there are turbines on Deer Island, in Medford, near Yale Electric, that are not on [the] wind energy map... that information should be included to make it up-to-date." This response highlights how an exhibit's content played a role in helping some visitors determine whether or not an exhibit was out-of-date.

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### ***2.3 Exhibit content proved to be the most compelling reason for finding it up-to-date***

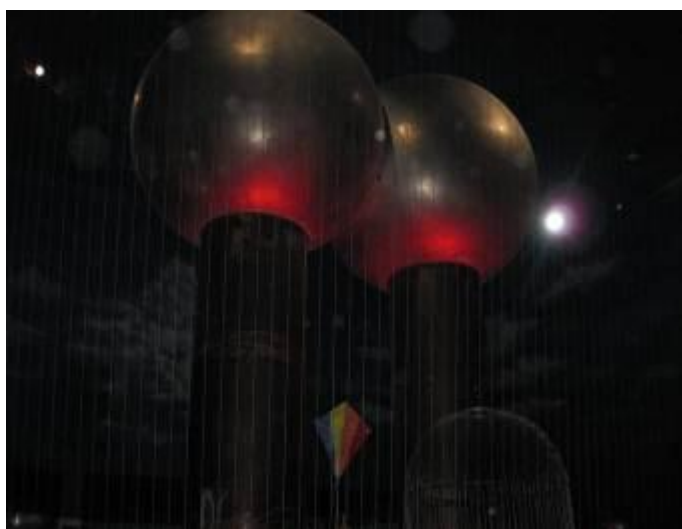
Content certainly had an impact on which exhibits visitors thought were out-of-date, but content played an even stronger role when visitors explained why they chose exhibits to be up-to-date. Table 6 shows that visitors who took the exit interview frequently cited an exhibit was up-to-date if they found the content interesting (27/111). Visitors who took the exit interview also commonly said that exhibits were up-to-date if they thought the content was up-to-date (23/111).

**TABLE 6. Reasons given for why exhibits were up-to-date (n=111).**

Code/Reason	Count	Example Quote
Content is interesting	27	I just thought it was really cool, how they made the tornado and everything.
Content is up-to-date	23	It is about the newest technology.
There were computers/technology	13	New computer section with weather... that was new.
The exhibit was new	11	Newer to us, haven't been here as much.
It looks new	10	Seemed to have some newer stuff.
The activities were interactive	9	More of that hands-on stuff that is fun.
Other up-to-date	8	Because it was a live presentation.
It was up-to-date in comparison to other exhibits	4	I don't know, just out of all of them it seemed the most up-to-date.
Don't know	2	I don't know.
Content was static	2	It is about science... and science is never old!
No response	2	No answer.

Moreover, visitors who participated in the camera interview also mentioned content as an important reason why they considered an exhibit to be up-to-date. For example, one visitor who took a photo of the *Theater of Electricity* to represent an up-to-date exhibit said, “[t]he show was really helpful, the info was cool and how he did it was interesting.” Her photo of the *Theater of Electricity* can be seen in Figure 5. Another visitor who picked the Wind/Solar Energy exhibits as up-to-date cited its content as the central reason. Her photo can be seen in Figure 6. While explaining her choice, she described how the exhibit’s interesting content had provoked a stimulating conversation among family members: “My daughter in law and I talked a lot about this, it got a good message, debate across.”

**FIGURES 5 and 6, Examples of visitor’s choices for exhibits that are up-to-date based on interesting content.**



*Theater of Electricity*



*Wind/Solar Energy*

Figure 7 shows an additional photo of the Wind/Solar Energy exhibit that was taken by a different visitor during the camera interview. This visitor also cited the Wind/Solar Energy exhibit as up-to-date because of the content and stated, “[the exhibit is] very current, great to see info available on solar/wind energy, the direction we are heading in, although some people aren't happy.”

Figure 8 showcases a participant's photo of the *Intro to Nanotechnology* exhibit as one more example of an up-to-date exhibit. *Intro to Nanotechnology* was commonly mentioned by visitors as being up-to-date due to its content. As one camera interviewer participant explained, “[This is a] current technology going on today and something a lot of people haven't been exposed to, [and the exhibit] provided a good intro, well-laid out, good info on the right level.” All of these comments from the camera interviews emphasize how visitors relate up-to-date exhibits with current content. More photos highlighting up-to-date exhibits that were taken by visitors during the camera interview can be seen in Appendix G.

**FIGURES 7 and 8, Examples of visitor's choices for exhibits that are up-to-date based on up-to-date content.**



#### ***2.4 Additional reasons for why visitors found exhibits up-to-date***

Just as visitors had multiple reasons to identify exhibits as outdated, they had multiple reasons to identify exhibits as up-to-date. Aside from mentioning content, other common responses noted an exhibit's use of technology and its aesthetic appeal. Visitors felt that exhibits which featured technology and made use of computers to convey information or activities were up-to-date. For instance, one visitor who took the exit interview explained that “When I think up-to-date, I think technology... the technology at the *Virtual Fish Tank* was impressive.” In terms of aesthetics, exhibits that were deemed to be new or renovated were also considered up-to-date. One visitor who took the exit interview chose the Current Science and Technology exhibits as the most up-to-date because it “looks new and shiny!” Comments such as these indicate that although content

was the main reason visitors cited an exhibit as up-to-date, aesthetics and technology were also important factors that influence visitor's impressions.

### 3. NEW ENGLAND HABITATS: EFFECTIVE REFURBISHMENT

The New England Habitats exhibition was refurbished in 2010 as part of the Museum's program of continuous updating of permanent exhibitions. The exhibition, one of the Museum's flagship galleries, was built in the late 1950-early 1960s. A 1991 refurbishment incorporated groundbreaking multi-sensory exhibits to the dioramas to provide access for visitors with disabilities, launching the Museum's efforts to create accessible, universally-designed experiences. The 2010 refurbishment was intended to be a short-term refreshing of the content in the gallery. This was in preparation for a comprehensive rehabilitation of the exhibition as part of the Museum's Strategic Plan, which will introduce new themes to the permanent exhibitions throughout the Museum, stressing the interrelatedness of the natural and designed worlds.

The goal for the 2010 project was to refresh the gallery look and feel, which dated back to the original 1950s installation. The educational content was to be retained as much as possible, and new content that would begin to make connections between natural history and human activity was also incorporated. The access improvements added in 1991 were to be retained, and the back-lit white on black label copy, which had been recognized as an issue in 1991 but was not addressed, was to be made more accessible.

**Figures 8 and 9, Examples of *New England Habitats* before and after refurbishment.**



**NEH Pre-refurbishment**



**NEH Post-refurbishment**

#### ***3.1 Visitors' perceptions of NEH were more favorable after refurbishment***

To gauge feedback on the refurbishment of the *New England Habitats* (NEH) exhibit, exit interview responses of visitors who had been to NEH were compared with data specifically collected after the changes. In comparison to the responses from visitors who said they had gone

to NEH on the exit interview, responses after the renovation were significantly more positive.<sup>1</sup> As seen in Table 7, before NEH’s transformation, 54% of visitors liked the exhibit while 18% said they disliked the exhibit. In contrast, after the changes to NEH, 90% of visitors liked the exhibit and 0% disliked it. These numbers point to a notable increase in visitors who had positive impressions of the exhibit after the refurbishment.

**TABLE 7. *New England Habitats* Pre and Post-Refurbishment like/dislike scores.**

	Pre-Refurbishment (n=50)		Post-Refurbishment (n=41)	
	Count	%	Count	%
Like	27	54.0%	37	90.2%
Dislike	9	18.0%	0	0.0%
Neutral	14	28.0%	4	9.8%

In the pre/post-refurbishment NEH data, the same upward trend was evident when visitors rated NEH as either out-of-date or up-to-date. Visitors were significantly more likely to call the exhibit up-to-date after the refurbishment.<sup>2</sup> Table 8 shows that before NEH’s changes, 46% of visitors considered the exhibit as out-of-date while only 24% thought it was up-to-date. Whereas after the renovation to NEH, 17% of visitors felt it was out-of-date and 73% said it was up-to-date.

**TABLE 8. *New England Habitats* Pre and Post-Refurbishment up-to-date/out-of-date scores.**

	Pre-Refurbishment (n=50)		Post-Refurbishment (n=41)	
	Count	%	Count	%
Up-to-date	12	24.0%	30	73.2%
Out-of-date	23	46.0%	7	17.1%
Neither	15	30.0%	4	9.8%

Aside from the improved ratings, visitors’ explanations for why they categorized NEH as either up-to-date or out-of-date were, in general, more positive in the post-interview. While pre-refurbishment comments focused on the fact that NEH was an old or well-known exhibit, post-refurbishment responses often highlighted the exhibit’s content or interactive elements. For instance, pre-renovation comments echoed one visitor’s sentiment that NEH felt out-of-date because it has “[b]een the exact same for my entire life... almost forty years.” However, in the post-refurbishment interview, visitors’ comments emphasized reasons why NEH was seen as up-to-date. For example, one visitor who commented on NEH’s content and said, “[w]e’ve seen all

<sup>1</sup>  $\chi^2(2, N=91) = 15.38, p < .001$ .

<sup>2</sup>  $\chi^2(2, N=91) = 21.94, p < .001$ .

these animals... when we think of New England wildlife these are the animals we think of.” A different visitor explained, NEH was up-to-date because of “[t]he features it offers. Neat you can smell the environment, cool things light up.” These quotes highlight features of the exhibit that existed before the refurbishment, but were not viewed as up-to-date until the aesthetics of the exhibit were changed.

This along with the data from the pre and post NEH interviews suggests that this is an effective refurbishment of the exhibit. However, it is important to note that participants who took part in the post-refurbishment interview were not as familiar with MOS as the participants who took part in the pre-refurbishment interviews (see Appendix E for demographic tables). These demographic differences may be due to the different times of year in which the data were collected. Since visitors who are more familiar with MOS are more likely to feel that exhibits are out-of-date (Lindgren-Streicher & Reich, 2011b), the higher number of visitors who lack familiarity with MOS could account for the differences in perception of NEH seen in the pre/post-refurbishment ratings.

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### ***3.2 Visitor Experience Monitoring project suggests individual refurbishments are not enough to change overall impression of museum***

Findings from the Visitor Experience Monitoring project (VXM) provide a broader view of visitor perceptions of how up-to-date the Museum is overall. VXM data were collected through the use of an on-line survey, which was delivered via email to visitors at the Museum who were randomly selected by members of the Research and Evaluation Department to provide their email addresses for the purpose of the study. This survey was delivered electronically to visitors the day after their visit. From July 2009 through June 2010, 1,261 randomly selected visitors completed the survey. A total of 6,537 visitors were approached, for an overall response rate of 19% (this includes both those who refused to provide their email and those who did not fill out the survey but provided their email).

As part of this longer, on-line survey, visitors were asked to rate the statement “the Museum appeared up-to-date” on a scale of 0 (Strongly disagree) to 10 (Strongly agree). Between July 2009 and June 2010, 46.1% of respondents rated this question a 9 or 10, while 16.3% rated it a 0-6. During the survey period, the Museum undertook several refurbishment projects for its permanent exhibits, including *Science in the Park*, *New England Habitats*, and a partial refurbishment of *Investigate!* These projects were completed throughout the fiscal year, so to gain an approximate comparison of scores on “the Museum appeared up-to-date,” ratings from the first quarter (July-September) and fourth quarter (April-June) were compared. Between the first and fourth quarter, there was no change in visitor rating of how up-to-date the Museum was.<sup>3</sup> Therefore, although data from *New England Habitats* portion of this study indicates that refurbishing specific exhibits may change visitors’ perceptions when considering these individual exhibits, the VXM data suggests that visitors’ overall impression of the museum stayed the same.

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<sup>3</sup> Due to the distribution of the visitor responses, all statistical comparisons between quarters were made using the Mann Whitney U statistical test, which is a nonparametric statistical test designed to compare ordinal data with non-normal distributions

## IV. CONCLUSION

This study offers valuable insight into which exhibits are perceived as outdated by visitors to the Museum of Science, Boston (MOS). Visitors who participated in the exit interview were asked to categorize 19 exhibits at MOS in terms of out-of-date and up-to-date; *Introduction to Nanotechnology*, the Current Science and Technology exhibits, and *Beyond the X-Ray* had the highest net scores whereas *New England Habitats*, *Investigate!*, and *Birth* received the lowest net scores. When further asked to specify the one most out-of-date exhibit and the one most up-to-date exhibit, *Science in the Park*, *Introduction to Nanotechnology*, and the *Theater of Electricity* were the top three up-to-date choices and *New England Habitats*, *Making Models*, *Mathematica* and *Birth* were considered the most out-of-date.

Moreover, this study underscores the fact that certain characteristics such as familiarity, aesthetics, and content affect how visitors view exhibits. In fact, exit interview participants who had not been primed to consider whether exhibits were up-to-date or out-of-date had similar responses to visitors who were specifically asked to take photos of up-to-date or out-of-date exhibits. Across all of the interview methods in this study, visitors agreed that familiarity and the aesthetics of an exhibit contribute to their opinion than an exhibit is outdated. If they know an exhibit or have seen it at the museum for a long time, visitors often feel that it is out-of-date. Not surprisingly, broken components or missing pieces also made many visitors feel that an exhibit was out-of-date. Content proved to be an especially important factor for visitors when they reflected on up-to-date exhibits. Visitors often rated exhibits as up-to-date if they found the content was interesting or if they thought the content was up-to-date. Furthermore, technology and the use of computers also added to whether or not an exhibit was seen up-to-date. Exhibits that seemed to be new or recently renovated were also more likely to be considered up-to-date.

The analysis of the *New England Habitats* data suggests that the NEH exhibit refurbishment may have been effective. Although it is important to note that visitors who took part in the post-renovation interviews were less familiar with the museum, visitors' comments and ratings were, in general, much more favorable. However, even though this data suggest that refurbishment can affect visitors' impressions of individual exhibits, the latest VXM data still suggest that individual gallery refurbishments are not translating into visitors seeing the museum as a whole in a different light.

This study points to several overall recommendations for the Exhibits Department. The focus on exhibit maintenance must continue and the timelines for exhibit refurbishment should be addressed. Moreover, because content was seen as an important reason for why exhibits were considered up-to-date, the Exhibits Department might consider smaller but more frequent updates to time-sensitive content. These targeted more frequent updates could include the renovation of a few select panels in each exhibit that contain specific content that is outdated. These panels, while not major reinstallations, could address the latest developments in the field, current content, or new discoveries.

The exhibit department should especially consider refurbishing or replacing exhibits that have been on the floor for a significant amount of time, as familiarity is cited by visitors as a main reason why exhibits are thought of as out-of-date. These data also point to particular exhibits that

require more immediate attention. Two different groups of out-of-date exhibits emerged: those that were considered out-of-date yet liked, and those that were seen as both out-of-date and associated with visitors' negative feelings. The out-of-date exhibits that were liked by visitors perhaps need only small updates that retain the exhibit's core content and the aesthetic approach. In contrast, the exhibits which are both out-of-date and not well liked are in need of more pressing and complete refurbishment or replacement.



## REFERENCES

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- Lindgren-Streicher, A., & Reich, C. (2011b) [VXM audience segmentation]. Unpublished raw data.
- Reich, C., & Kunz Kollmann, E. (2008) *A closer look at the visitor experience: An analysis of visitor comment cards*. Museum of Science: Boston, MA.

## APPENDIX A: EXIT INTERVIEW INSTRUMENT

**1. Which of the following exhibits did you visit today?**

*[Show cards with photos of exhibits]*

*Second floor*

- Birth
- Lighthouse
- Investigate!
- Science in the Park

*First floor*

- New England Habitats
- Mathematica
- Innovative Engineers
- Current Science & Technology Exhibits
- Virtual Fish Tank

- Theater of Electricity
- Making Models

*Basement*

- Bird's World
- Natural Mysteries
- Take a Closer Look
- Dinosaurs
- Living on the Edge
- Beyond the X-Ray
- Introduction to Nanotechnology
- Wind Energy/Solar Energy

*[Remove cards of exhibits NOT visited, leaving only cards for exhibits]*

**2. Of these exhibits that you did visit, I'd like you to sort them into three groups: Exhibits that you thought were up-to-date, exhibits that you thought were out-of-date, and a middle pile of exhibits that you thought weren't either up-to-date or out-of-date.**

	Up-to-date	Neither	Out-of-date	Not visited
Birth				
Lighthouse				
Investigate				
Science in the Park				
NE Habitats				
Mathematica				
Innovative Engineers				
CS&T				
VFT				
Making Models				
Bird's World				
Natural Mysteries				
TaCL				
Dinos				
Living on the Edge				
BTXR				
Intro to nano				
Wind/solar energy				
Theater of Electricity				

**3. Great, thanks! Now I'd like to have you sort the exhibits you visited once more, again into three piles: exhibits that you liked, exhibits that you neither liked nor disliked, and exhibits that you disliked.**

	Liked	Neutral	Disliked	Not visited
Birth				
Lighthouse				
Investigate				
Science in the Park				
NE Habitats				
Mathematica				
Innovative Engineers				
CS&T				
VFT				
Making Models				
Bird's World				
Natural Mysteries				
TaCL				
Dinos				
Living on the Edge				
BTXR				
Intro to nano				
Wind/solar energy				
Theater of Electricity				

**4. And now I'd like you to pick the one exhibit you visited today that you thought was the MOST out-of-date.**

**Exhibit chosen:** \_\_\_\_\_

**And what about that exhibit made you feel it was out-of-date?**

**5. And now I'd like you to pick the one exhibit you visited today that you thought was the MOST up-to-date.**

**Exhibit chosen:** \_\_\_\_\_

**And what about that exhibit made you feel it was up-to-date?**

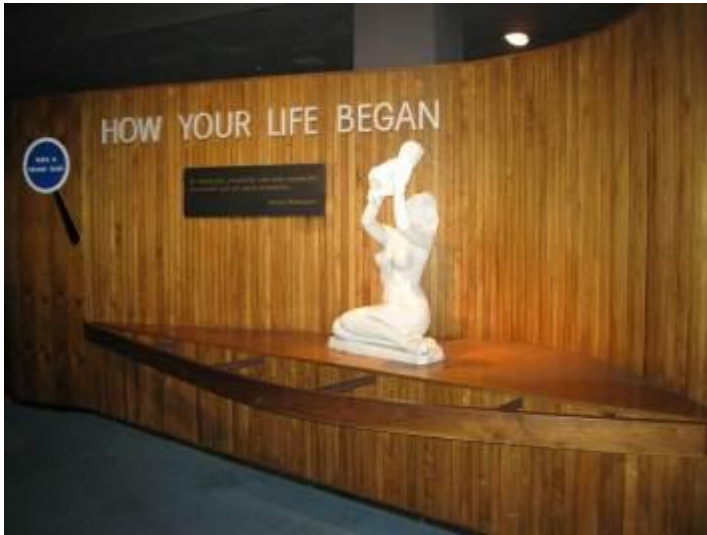
**Thanks, I just have a couple quick questions for you to fill out yourself now.**

*[Hand clipboard with demographics]*

**[Once completed, thank, give sticker]**

Sample of exhibit photo cards that were used during the Exit Interview:

Birth



Light House



Investigate



Science in the Park



## APPENDIX B: CAMERA INTERVIEW INSTRUMENT

**Out-of-date 1** Photo # \_\_\_\_\_

What about this exhibit made you feel it was out-of-date?

**Out-of-date 2** Photo # \_\_\_\_\_

What about this exhibit made you feel it was out-of-date?

**Out-of-date 3** Photo # \_\_\_\_\_

What about this exhibit made you feel it was out-of-date?

**Up-to-date 1** Photo # \_\_\_\_\_

What about this exhibit made you feel it was up-to-date?

**Up-to-date 2** Photo # \_\_\_\_\_

What about this exhibit made you feel it was up-to-date?

**Up-to-date 3** Photo # \_\_\_\_\_

What about this exhibit made you feel it was up-to-date?

## **APPENDIX C: NEW ENGLAND HABITATS EXIT INTERVIEW INSTRUMENT**

**1. For *New England Habitats*, the exhibit you just visited, would you say that it was:**

Out-of-date

Up-to-date

Neither up-to-date nor out-of-date

[if “out-of-date”] **And what about that exhibit made you feel it was out-of-date?**

[if “up-to-date”] **And what about that exhibit made you feel it was up-to-date?**

**2. And would you say that you**

Liked

Disliked

Neither liked nor disliked

**this exhibit?**

**Thank, give demographic survey.**

## APPENDIX D: DEMOGRAPHIC SURVEY INSTRUMENT

Please tell us a little more about yourself.

1. When was the last time that you visited the Museum of Science?  
(Please check one)
  - Never
  - Within the past three months
  - 3 – 6 months ago
  - 6 months to within the last year
  - 1 – 2 years ago
  - 2 – 5 years ago
  - 5 – 10 years ago
  - More than 10 years ago
  - Not sure
  
2. How many times have you visited the Museum of Science in the past **two years**?  
(Please check one)
  - None
  - 1-2 times
  - 3-5 times
  - 5-10 times
  - More than 10 timesNumber of times attended: \_\_\_\_\_
  
3. Which of the following categories represents your highest level of education? (Please check one)
  - Some high school
  - High school degree
  - Some college
  - College degree
  - Some graduate work
  - Graduate degree
  - Other \_\_\_\_\_
  
4. Are you a member of the Museum of Science? (Please check one)
  - Yes
  - No
  
5. What is your gender? \_\_\_\_\_
  
6. What is your age? (Please check one)
  - Younger than 18
  - 18 – 24
  - 25 – 29
  - 30 – 34
  - 35 – 44
  - 45 – 54
  - 55 – 64
  - 65 – 74
  - 75 – 84
  - 85 or older
  
7. With which racial/ethnic group(s) do you most identify? (Please check all that apply)
  - African-American
  - American Indian or Alaskan Native
  - Asian-American
  - Hispanic/Latino
  - White, not of Hispanic origin
  - Other: \_\_\_\_\_
  
8. Do you have a permanent or temporary disability?
  - Yes
  - NoIf yes, how would you describe the disability?
  - Mobility
  - Emotional
  - Learning
  - Auditory
  - Visual
  - Cognitive
  - Other

## APPENDIX E: DEMOGRAPHIC TABLES

Age	Exit Interview (n=112)		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
Younger than 18	3	2.7%	2	16.7%	2	4.9%
18-24	19	17.0%	2	16.7%	7	17.0%
25-29	10	8.9%	1	8.3%	4	9.8%
30-34	4	3.6%	1	8.3%	8	19.5%
35-44	31	27.7%	3	25.0%	12	29.3%
45-54	23	20.5%	1	8.3%	6	14.6%
55-64	13	11.6%	1	8.3%	2	4.9%
65-74	5	4.5%	1	8.3%	0	0.0%
75-84	0	0.0%	0	0.0%	0	0.0%
85 or older	0	0.0%	0	0.0%	0	0.0%
No response	1	0.9%	0	0.0%	0	0.0%

Gender	Exit Interview (n=112)		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
Male	37	33.0%	5	42.0%	15	37.0%
Female	73	65.2%	7	58.0%	25	61.0%
No answer	2	1.8%	0	0.0%	1	2.0%

Last Visit to MOS	Exit Interview (n=110 <sup>4</sup> )		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
Never	7	6.4%	4	33.3%	12	29.3%
Within the past 3 months	26	24.0%	1	8.3%	7	17.1%
3-6 months ago	10	9.1%	2	16.7%	3	7.3%
1-2 years ago	9	8.2%	1	8.3%	2	4.9%
2-5 years ago	24	22.0%	3	25.0%	2	4.9%
5-10 years ago	22	20.0%	1	8.3%	5	12.2%
More than 10 years ago	3	2.7%	0	0.0%	7	17.1%
Not sure	8	7.3%	0	0.0%	3	7.3%
Other?	1	0.9%	0	0.0%	0	0.0%

<sup>4</sup> Two groups terminated interview before finishing survey.  
Outdated Exhibits



Number of visits to MOS in past two years	Exit Interview (n=112)		Camera Interview (n=12 <sup>5</sup> )		NEH Survey (n=41)	
	N	%	N	%	N	%
None	33	29.5%	N/A	N/A	24	58.5%
1-2 times	34	30.3%	N/A	N/A	8	19.5%
3-5 times	27	24.1%	N/A	N/A	4	9.8%
5-10 times	8	7.1%	N/A	N/A	4	9.8%
More than 10 times	9	8.0%	N/A	N/A	1	2.4%
Other	1	0.9%	0	0.0%	0	0.0%

Member Status	Exit Interview (n=112)		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
Yes	43	38.4%	8	66.7%	6	14.6%
No	67	59.8%	4	33.3%	34	82.9%
No response	2	1.8%	0	0%	1	2.4%

Education	Exit Interview (n=112)		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
Some high school	2	1.8%	0	0.0%	2	4.8%
High school degree	7	6.3%	0	0.0%	3	7.3%
Some college	19	16.7%	0	0.0%	5	12.2%
College degree	32	28.6%	5	41.7%	11	26.8%
Some graduate work	12	10.7%	0	0.0%	1	2.4%
Graduate degree	37	33.0%	4	33.3%	18	43.9%
Other	2	1.8%	3	25.0%	1	2.4%

Race	Exit Interview (n=112)		Camera Interview (n=12)		NEH Survey (n=41)	
	N	%	N	%	N	%
African-American	3	2.7%	0	0.0%	0	0.0%
American Indian/Alaska Native	1	0.9%	0	0.0%	0	0.0%
Asian-American	2	1.8%	1	8.3%	4	9.8%
Hispanic/Latino	2	1.8%	1	8.3%	2	4.9%
White, not Hispanic origin	98	87.5%	10	83.3%	34	82.9%
Other	4	3.6%	0	0.0%	1	2.4%
No Answer	2	1.8%	0	0.0%	0	0.0%

<sup>5</sup> The question about number of visitors to MOS in the past two years was left out of the Camera Interview.

**APPENDIX F: CAMERA INTERVIEW PHOTOS OF OUT-OF-DATE EXHIBITS**



**Human Body Connection**



**Optical Illusions**



**Sea Explorer**



**A Bird's World**



**Engines/Wheels**



**Mathematica**



**Mathematica**



**Viscosity exhibit**



**Space**



**African Water Hole diorama**



**Computing Revolution**



**Transportation**



**Dinosaurs**



**Transportation**



**Mathematica**



**Imaging**



**Mathematica**



**All exhibits**



***African Water Hole diorama***



***Current Science & Technology***



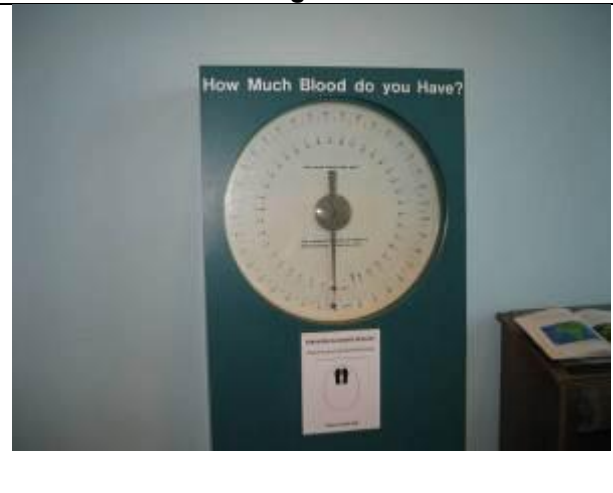
***A Bird's World***



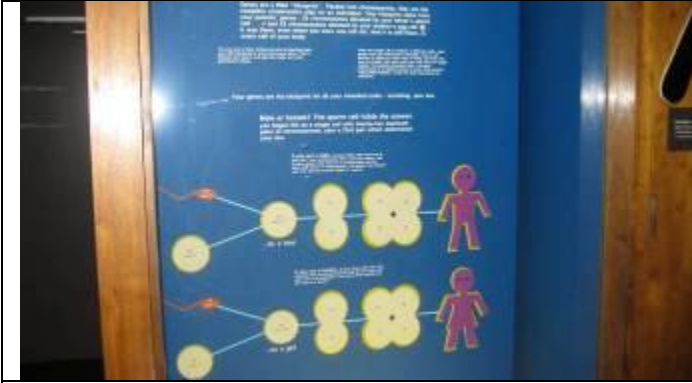
***Making Models***



***Investigate!***



***Human Body Connection***



**Birth**



**Human Body Connection**



**Natural Mysteries**



**New England Habitats**



**Natural Mysteries**



**Making Models**



*Dinosaurs*

**APPENDIX G: CAMERA INTERVIEW PHOTOS OF UP-TO-DATE EXHIBITS**



*Theater of Electricity*



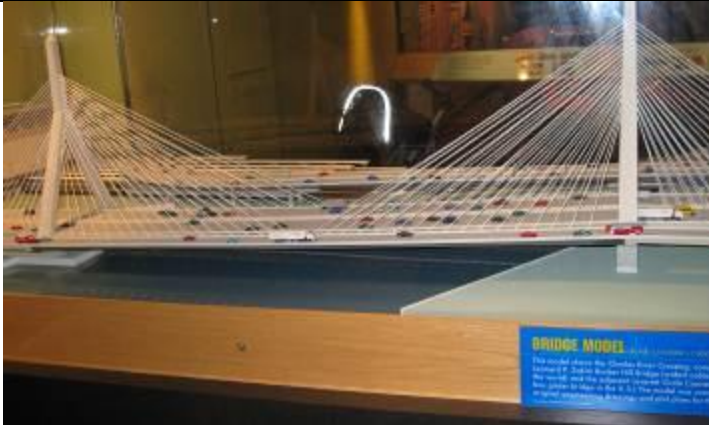
*Intro to Nanotechnology*



*Mathematica*



*Natural Mysteries*



*The Big Dig*

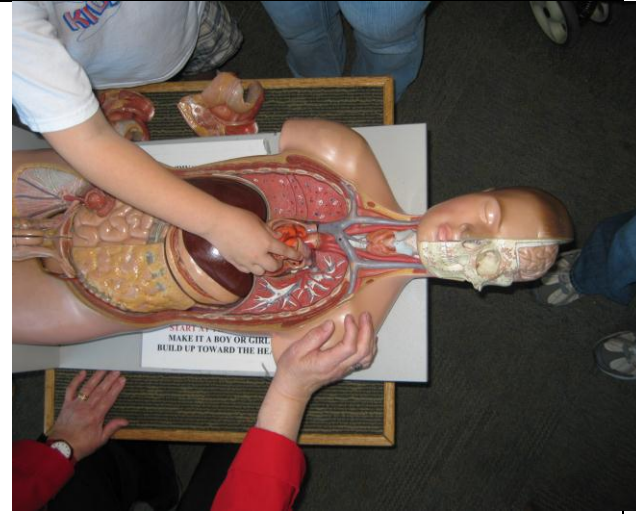


*Intro to Nanotechnology*





**Tamarins**



**Human Body Connections**



**Human Body Connections**



**The Big Dig**



**Wind/Solar Energy**



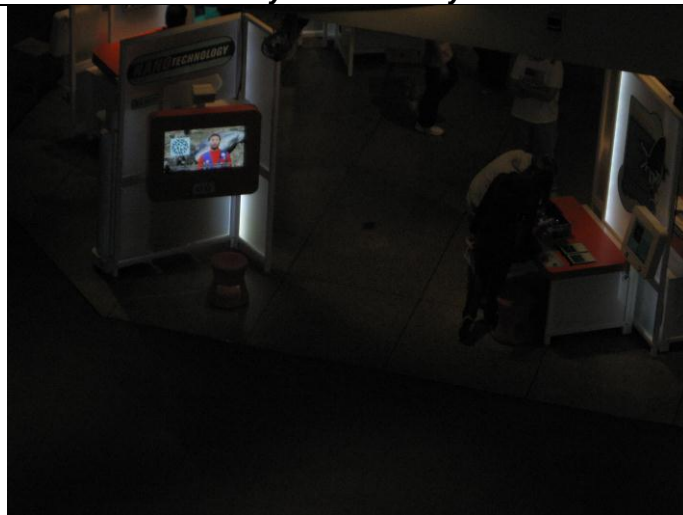
**Intro to Nanotechnology**



**Beyond the X-Ray**



**Virtual Fish Tank**



**Intro to Nanotechnology**



**Current Science & Technology**



**Current Science & Technology**



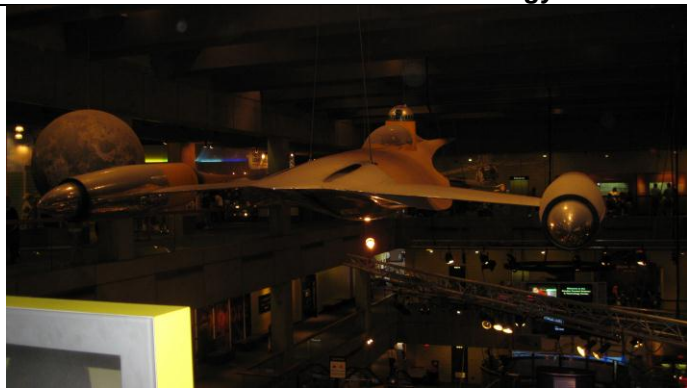
**Science in the Park**



***Current Science and Technology***



***To the Moon***



***To the Moon***



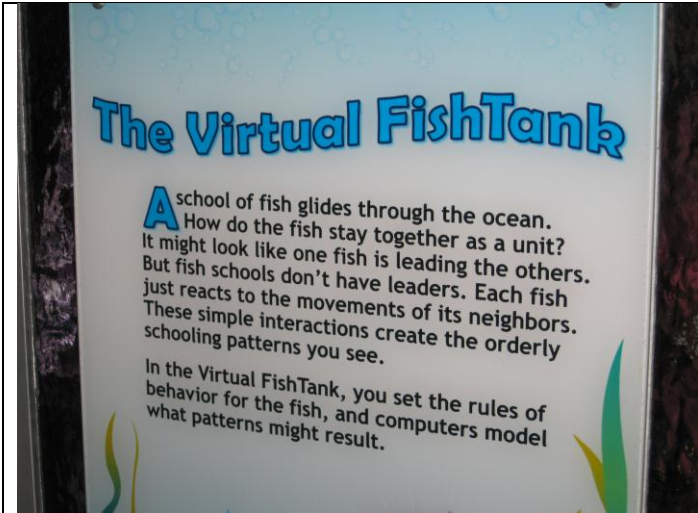
***Audiokinetic Sculpture***



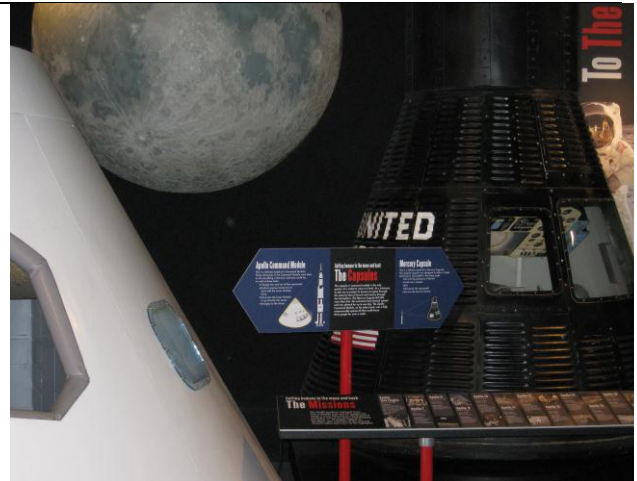
***Wind/Solar Energy***



***Dinosaurs***



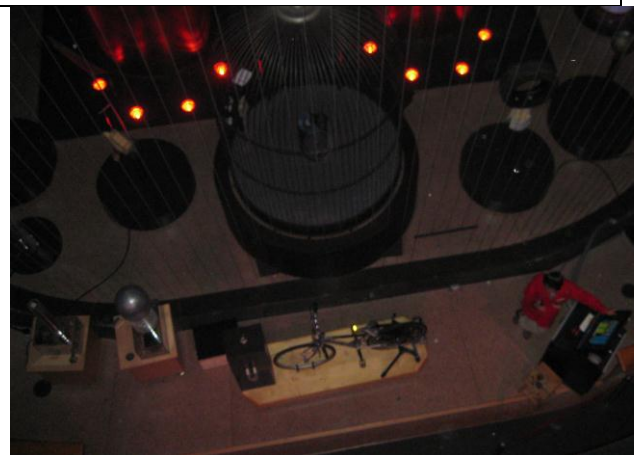
**Virtual Fish Tank**



**To the Moon**



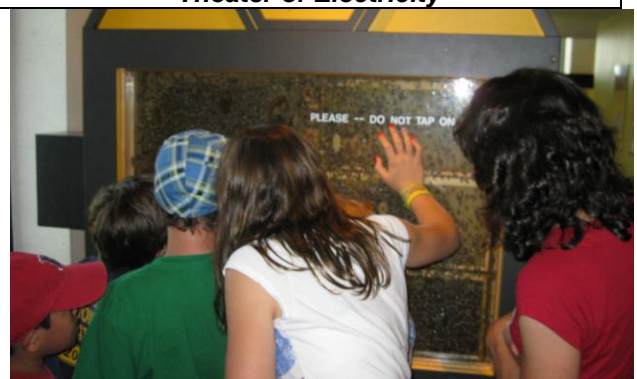
**The Light House**



**Theater of Electricity**



**Helping Hands**



**Bees**



**Dinosaurs**



**Natural Mysteries**



**Natural Mysteries**



**Butterfly Garden**



**Optical Illusion**



**Audiokinetic Sculpture**