Museum Visitors Interact with Explore Evolution Exhibition

Formative Evaluation Report for the Explore Evolution Project

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Executive Summary

Explore Evolution is a project funded by the National Science Foundation to make evolution accessible to young people and the general public. It includes development of permanent museum exhibit galleries, publication of an activity book for middle school aged youth, collaboration with 4-H youth organizations, and construction of a website. This report focuses on the formative evaluation of the exhibit gallery. The other elements of the formative evaluation, including trial testing of the activities included in the book, are not included in this report.

The formative evaluation of the full-scale prototype of the Explore Evolution Exhibition took place in October 2004. The purpose of the evaluation was to assess strengths and limitations of the exhibit and to provide feedback both to the exhibit developers and the museum directors. Data were gathered about visitor understanding and reactions to improve the exhibit. Visitor observations and interviews with both adults and youth across a two-day period were conducted at the Science Museum of Minnesota, where all prototype components were on display October 20-25. A total of twenty-eight interviews were conducted, involving thirty-seven visitors. In addition, sixteen of those visitors were tracked as they moved through the exhibit. Visitor demographics appeared similar to other museum visitor studies, although a slightly larger percentage of visitors in this study listed high school as their highest level of education.

Visitors spent, on average, twenty-one minutes at the exhibit, and two-thirds of them spent time at every one of the seven organism units. Visitors typically followed the route intended by the designers of the gallery, moving from the virus, the smallest organism, clockwise around the gallery, looking at each successively larger organism. Very few visitors were observed spending time at the panels in the middle of the gallery that explained the overall evolution principles of variation, inheritance, selection and time.

With respect to visitor understanding of evolution, we found that highlighting specific research projects and the scientists working on them provided an engaging framework for visitors. In most cases, visitors were able to connect with the scientists and describe the main points of the different research components presented. When asked what the main point of the exhibit was, all of the adults interviewed included "evolution" in their answers, and just over half of the youth interviewed identified "evolution" as the primary theme of the exhibit. There was some variation in which organisms and related research that visitors were able to explain. For example, sexual selection with the Hawaiian flies and the co-evolution of the ant and its partners were more difficult for visitors to grasp than the similarity between chimp and human DNA and the idea of whales evolving from land mammals.

Overall, visitor reaction to the exhibit was positive. Visitors spent time looking at the specimens and touching the models, as well as interacting with the manipulative components, indicating that the overall concept of the lab benches was successful in

drawing visitors in. Visitors said they liked the general appearance of the exhibit, and were mostly able to understand the graphics. They enjoyed the interactive components of the exhibit and wanted even more hands-on activities.

Specific findings for each organism included both strengths and areas that needed improvement. While the models and specimens were well-received across almost all the organism units, some adjustments were recommended. These included reworking the whale bone display to make it more understandable, and fixing the focus on the diatom microscope to be easier for visitors to use. Specific glitches in the interactive components also needed to be worked out, to make them more understandable and user friendly. For example, visitors were unable to understand how to use the gel interactive at the HIV unit and visitors had difficulty working with fly interactive audio activity. In addition, some visitors found the text difficult to understand, with too many unfamiliar terms. As a result of the evaluation, a number of logistical, mechanical, and presentation changes were suggested. These included reorganization of the introductory panels and the addition of an attractive visual model (the DNA model), modifications to the presentation of some concepts, and, where possible, reduction in the amount and complexity of the text.

Recommendations resulting from the formative evaluation of the full-scale prototype were incorporated into the final Explore Evolution Exhibition. The process of the prototype evaluation, including the collaboration of the evaluators, exhibit developers, available scientists, museum directors and staff, and the project director provided timely and valuable feedback to make the exhibit more accessible and educational for future museum visitors.

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I. Introduction

This report is one in a series of evaluation reports on the Explore Evolution Project, funded by the National Science Foundation. It summarizes the formative evaluation of the full-scale prototype of the Explore Evolution Exhibit, which was conducted at the Science Museum of Minnesota. Prototype evaluation is recommended in museum exhibit design to refine and improve the exhibit during the actual fabrication of the components (McLean, 1993; Taylor, 1991). Visitor feedback on a mock-up or early version of the exhibit provides important information about visitor reaction and understanding of the exhibit, and visitor interaction with the manipulatives. It can identify problems or issues so that they can be addressed before the final exhibit is completed. While many prototype evaluations, when conducted, are on single exhibit units or portions of a gallery, the Explore Evolution prototype evaluation was conducted on the entire gallery. This enabled visitors to see each section in the context of the whole exhibit. The prototype evaluation was designed by the Explore Evolution evaluators, in consultation with the project director Judy Diamond, to gather data from museum visitors about the exhibit and provide feedback to the exhibit developers, museum partner directors, and project director. The formative evaluation results were used to improve the final version of the Explore Evolution Exhibit.

Purpose of the Evaluation: The evaluation was designed to assess strengths and limitations in the exhibit and to provide feedback to both the exhibit developers and the museum partner directors. The primary purpose of the evaluation was to gather data about visitor understanding and reaction to the exhibit to improve the exhibit.

Evaluation Questions and Instruments

The fundamental questions guiding this evaluation were:

1. What are the strengths and limitations of the exhibit?
2. What changes should be made to improve the exhibit to increase visitor interest and comprehension?

II. Description of Explore Evolution Project

Explore Evolution is a project funded by the National Science Foundation to make evolution accessible to young people and the general public. It encompasses a consortium of six museums in the Midwest and South working together with five statewide 4-H programs, and includes development of permanent exhibit galleries, publication of an outreach book by the National Science Teachers Association Press, collaboration with 4-H youth organizations, and construction of a website. The museum partners are: Exhibit Museum of Natural History at the University of Michigan, University of Kansas Natural History Museum and Biodiversity Center, Sam Noble Oklahoma Museum of Natural History at the University of Oklahoma, Texas Memorial Museum at the University of Texas at Austin, University of Nebraska State Museum, and

the Science Museum of Minnesota. The focus of the project is seven research projects that have made a major contribution to our understanding of evolution. For more details about the development of the project, see Diamond, et.al (2004).

This prototype evaluation focuses solely on the exhibit portion of the project. Specifically, the exhibit gallery covers the seven selected current research projects on evolution. These are: the work of Charles Wood on the rapid evolution of HIV, Edward Theriot and Sheri Fritz on the emergence of a new diatom species in the fossil record, Cameron Currie on farmer ants and their coevolving partners, Kenneth Kaneshiro on sexual selection among Hawaiian flies, Rosemary and Peter Grant on Galapagos finches, Svante Pääbo and Henrik Kaessmann on the genetic ties between humans and chimps, and Philip Gingerich on fossil discoveries of walking whales. The new permanent interactive exhibit galleries are designed to give visitors an opportunity to experience aspects of the research conducted by the scientists. These seven research projects were selected in part because they focus on different organisms (virus, diatom, ant/fungus, fly, finch, human, and whale), which range from the microscopic to the largest of all mammals and yet they all illustrate a common set of evolutionary principles. When the exhibit units are complete, each partner museum will have a permanent Explore Evolution gallery.

III. Methods

To answer the identified formative evaluation questions, two types of data were collected. First, an observational protocol was developed to record visitors' movements through the exhibit. Evaluators recorded how much time participating visitors spent at which exhibit units, and how they interacted with the different components of each unit. Second, visitors were asked open-ended questions about their understanding of the content, about how they interpreted and used the information presented, and their opinions about the exhibit. A portion of the interview was taped, to allow for more detailed information to be recorded. Demographic information was also gathered. Instruments used are included in Appendix A. In addition to the questions on the protocol, follow-up questions were also used when necessary to clarify and gather detail on visitors' responses.

Both adults and youth were targeted participants in this evaluation study. Since middle school level youth (aged 10-15) were a particular target audience for this exhibit, this was the minor age group targeted for inclusion in the evaluation.

Participants and Procedures

Prototypes of the entire set of units for the Explore Evolution Exhibit were set up at the Science Museum of Minnesota for review October 20-24, 2004. At this prototype review, a team of seven evaluators gathered data from museum visitors through observations and interviews over a two-day period. All procedures and instruments were approved by the University of Nebraska Institutional Review Board prior to data collection. See appendices for a copy of the observation and interview protocols.

Data were collected in two parts. The first part (Part A) comprised a complete observation and interview protocol, and sixteen visitors participated in Part A. This data collection took place on the first day and the morning of the second day. The second part

was a more focused interview that did not involve observation, and twenty-one visitors participated in Part B. This data collection took place on the second day.

Part A: Museum visitors were selected at random from nearby galleries or were asked to participate as they entered the Explore Evolution Gallery. These selected museum visitors were given a brief overview of the purpose of the research, informed of their rights as study participants, and then asked if they were willing to be included as participants in the study. The participants were then asked to visit the exhibit, taking as little or as much time as they wanted, visiting whichever units and components they chose. During this time, each participant's movements and interactions with others in the gallery were observed and recorded by an evaluator. The amount of time the visitor spent at each unit, the order in which he or she visited the different units, and the manipulatives with which the visitor interacted were recorded. (To clarify how "unit" is being used for descriptive purposes in this report, each "unit" comprises the group of gallery components focusing on a particular scientist's research and the organism(s) studied; for example, the HIV unit includes the large model, the lab bench with two interactive activities and informational back panel about the scientist, and a panel explaining the research on the evolution of the organism.)

When participants were done with their visit to the Explore Evolution Gallery, the evaluator walked with the visitor(s) back through selected units within the exhibit to ask specific questions about different components. Typically, interview data on two or three units were gathered from each visitor. Then afterward, in a private area off the gallery, visitors were asked about the meaning of the exhibit and specific questions about the different components of the exhibit units. Data gathering for Part A took place over the course of one and a half days. A total of sixteen visitors participated in these individual observations and interviews.

Part B: Because of the very limited time-frame of the data collection period (two days), the data gathering first was broader in scope and then became more focused as specific data needs surfaced. On the second day of data collection we asked visitors to visit particular components for which we needed more specific or additional visitor feedback. In addition, although the evaluation protocols were originally designed for data to be gathered one visitor at a time, during Part B of the actual data collection, all or multiple members of family groups were often eager to contribute their opinions. Because of this and the nature of the formative evaluation, data on multiple subjects was sometimes gathered at one time (for example, a father-daughter dyad). A total of twenty-one individuals participated in Part B during twelve group interviews.

At the conclusion of the every interview, participating visitors were given a $5 gift certificate to the Science Museum of Minnesota Store.

For each unit within the exhibit, data from six to fifteen visitors were gathered. For example, ten visitors responded to specific questions about the HIV unit. After the data were collected, the evaluators met together to summarize their findings. Specific recommendations were made about each exhibit unit, both in terms of strengths and limitations. These findings were presented to the museum directors and the exhibit fabricators, for their information and discussion, and decisions about changes were made

with these data in hand. The museum directors also had comments about the exhibit, and a summary of their suggestions about overall issues is included as an appendix to this report.

Demographics

Altogether, interview data were gathered in a total of twenty-eight interviews, involving thirty-seven visitors, nineteen adults and eighteen youth. Interview groups included adults alone, youth alone, adults and youth together and adults together. See Figure 1. for a breakdown of these interview groups. At the conclusion of each interview, the visitor (or the visitor's parent, if the visitor was a minor) completed a demographic form (note that some of the totals do not equal 100% because of missing data).

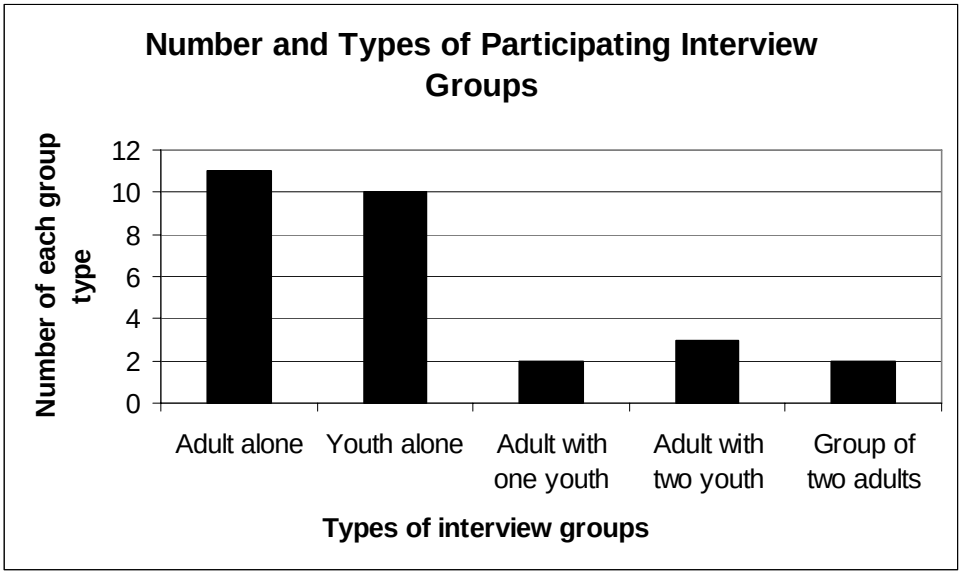

Figure 1. Number and types of participating interview groups.

Adult sample: The nineteen adult visitors' ages were: 18-24 years (21%), 25-40 years (21%), 41-64 years (53%), and 65+ years (0%) (one visitor did not report age). Educational levels completed by the visitors consisted of: high school (21%), 2-year college or vocational school (11%), 4-year college (42%), and graduate school (26%). See Table 1. for a comparison of the study sample education levels to other museum visitors.

Table 1. Total and museum-specific percentages of participants with different levels of education as compared to general natural history museum visitors.

Highest Education Level	Formative Evaluation Sample	Natural History/Science Centers[1]	Smithsonian[2]
High School	21%	12%	9%
Some College or completed College[3]	53%	54%	50%
Graduate School	26%	33%	42%

[1]Data from Korn, R. 1995. "An analysis of differences between visitors at natural history museums and science centers," *Curator, 38*: 150-160. Summary data from visitors surveyed at two natural history museums and two science centers.
[2]Data from "*Results of the 2004 Smithsonian-wide Survey of Museum Visitors*," (October, 2004), Washington, DC: Smithsonian Institution, Office of Policy and Analysis.
[3] Note that this category represents a combined category including "2-year college or vocational school," "associate degree," "one or more years of college but no degree," and "4-year college degree."

Only one participant, who was working on a biology/museums study degree, was involved in a biology-related profession; the other occupations were classified as science or engineering (n=1), education (n=7), homemaker (n=3), other professional (n=2), self-employed (n=2), laborer (n=1), and unemployed (n=1). Eighty-four percent had a religious affiliation; 16% did not. The median number of museum visits per year was 3 (range:1-20).

Child sample: The original targeted age range for youth participating in the evaluation was 10-15 years of age, however, some individuals who were younger and older were included in the final sample. The youth participating in the evaluation ranged in age from 6 to 17 years: Under 10 years old (n=3), 10-13 years (n=8), 14-17 years (n=7) (see Figure 2. for a more detailed graphical representation). The highest levels of education completed by a parent were: high school (28%), 2-year college or vocational school (17%), 4-year college (28%), and graduate school (17%). Sixty-seven percent had a religious affiliation; 22% did not (some did not report this). The median number of museum visits per year was 3 (range was 1-12). See Figure 3 for a graphical representation of annual number of museum visits for the entire group of visitors.

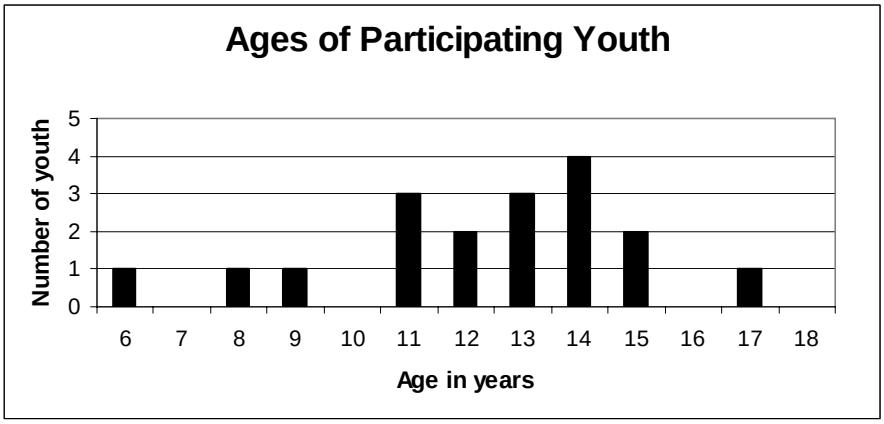

Figure 2. Ages in years of participating youth.

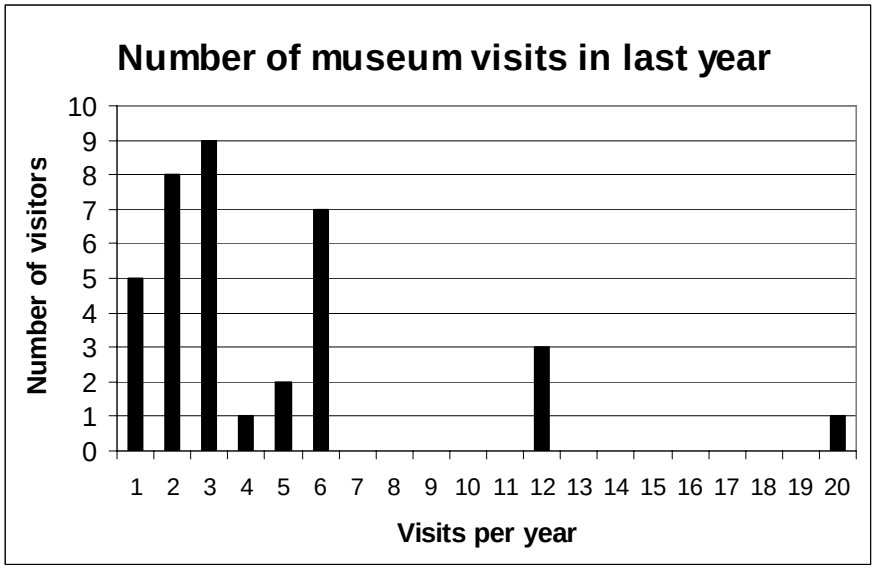

Figure 3. Participants' estimated number of visits to museums in the last year.

IV. Results

In Part A of the data collection, sixteen visitors' movements were tracked as they visited the Explore Evolution Exhibition. These visitors spent, on average, twenty-one minutes at this exhibit (range was 10-38 minutes) (See Figure 4 for a histogram of the amount of time spent).

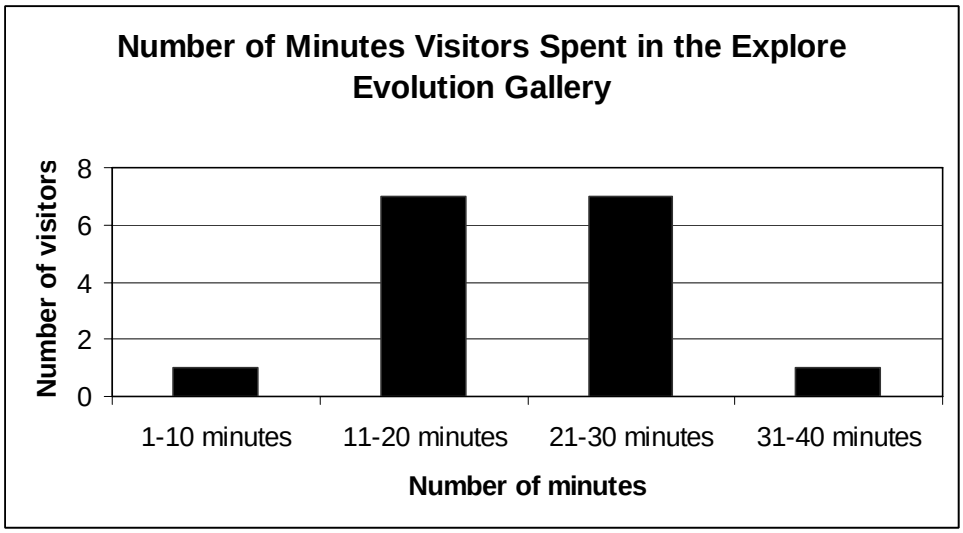

Figure 4. Number of minutes observed visitors spent in the Explore Evolution Exhibit.

Introductory Panels and Key Evolutionary Terms

The original floor plan of the Explore Evolution Exhibition included an advance organizer at the outside entrance to the gallery and an arrangement of the individual exhibit units from smallest to largest organism following around the perimeter of the gallery counterclockwise. See Figure 5 below of the floor plan at the Science Museum of Minnesota Explore Evolution Prototype Exhibition. A set of four informational panels

describing the four fundamental elements of evolution (*Variation, Inheritance, Selection, and Time*, (VIST)) was placed near the entrance in the center section of the gallery.

The acronym VIST is from the University of California Museum of Paleontology website (http://evolution.berkeley.edu) and provides a useful way of framing and remembering these concepts. VIST: *Variation* refers to the differences among individuals in a population. These can be described as differences in a particular trait (feature or behavior), as a mutation, or as genetic differences. *Inheritance* refers to traits (factors) that are inherited and passed from one generation to the next. *Selection* refers to the idea that organisms with traits that are adapted to the environment are more likely to survive (and pass these factors on to the next generation). *Time*: the number of generations produced over a given time period is a clue to whether evolution change will occur rapidly (as in HIV) or slowly (as in whales). From one generation to the next, a species may change ever so slightly, but given enough time, the result can be huge. The VIST panels were designed to provide a cohesive link across all the research projects on the seven different organisms, because a common set of evolutionary principles is involved. The VIST elements were repeated and explained in each exhibit unit for the specific organisms and research project featured.

Visitor Movement Through the Gallery

Each of the seven units included the following elements: 1) a lab bench with an interactive activity and informational back panel with information about the scientist(s), 2) informational panel about the evolution of that organism, and 3) specimens or touchable model.

Two-thirds of these visitors spent time at every one of the seven organism units, and they typically followed the route intended by the designers of the gallery. They moved from the smallest organism, the virus, which was located near the entrance and proceeded to move counterclockwise through the gallery as they looked at each successively larger organism (see Figure 5 for a drawing of a typical visitor's movement through the exhibit). Some visitors deviated slightly from this, for a number of reasons. The fly interactive bench and the ant/fungus videos were somewhat time-consuming for visitors, so sometimes others needed to wait before they could have a turn at these manipulatives. Some visitors waited by watching, others waited by moving on to another unit. One visitor moved clockwise through the exhibit. Others only visited a few of the units, usually because of time constraints. A few visitors moved from the diatom unit to the VIST panels, then to the whale model, and then wandered through other parts of the exhibit in a somewhat random order. With the typical visitor route counterclockwise following the wall of organism units, only one-quarter of visitors were observed spending time at the four VIST panels. Similarly, only one-quarter of visitors were observed viewing the history panel.

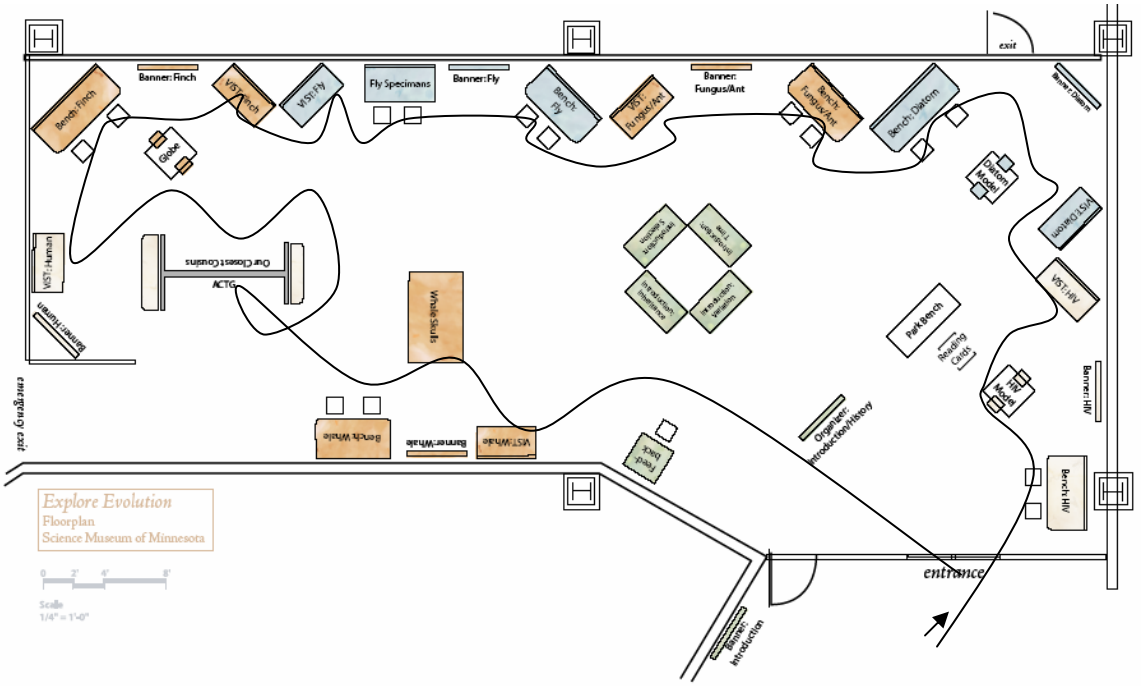

Figure 5. Typical movement pattern of visitors in Explore Evolution Exhibition.

During our observations, we noted that the first element of the exhibit that visitors encountered was the HIV lab bench, which visitors said was confusing and frustrating. So during the first day of data collection, we switched the HIV VIST panel and lab bench positions to make the exhibit entry more inviting. Many people were also immediately drawn to the HIV model as they entered the exhibit, and the new arrangement appeared to help facilitate that.

Introductory Panels

There were three types of introductory panels. One gave an overview of the exhibit and was outside the entrance of the gallery. The second was comprised of VIST panels, four introductory panels located in the center of the gallery: one for each term Variation, Inheritance, Selection and Time. The third was the History of Evolutionary Thought, located near the exit door. There was also a visitor feedback station at the end.

Because few visitors stopped by and viewed the central VIST panels during the first day of observations, these were also moved to try to enhance their visibility. However, even those visitors who did stop to read these panels did not typically spend much time, and few visitors linked the VIST concepts across the exhibit, in spite of VIST being a repeated element throughout each of the units in the exhibit. Consequently, there was much discussion about how to improve those elements of the exhibit. It was decided that the VIST icons need to be simplified and the explanations shortened. Originally, abstract symbols were used to signify each VIST element. For example, the variation symbol was a group of simple spheres which varied in pattern and color, while the time symbol was timeline. When asked specifically about these symbols, visitors said they did not notice them or if they did, did not understand the symbolism. We recommended that these icons be eliminated and the initial letter of each term be used instead (V for variation, I for inheritance, etc.). In addition, we recommended that a visual draw be

created to bring visitors to the four panel unit. It was decided that a large DNA model in the center of the four panels would be added for this purpose and that the text on the four panels would be simplified.

Exhibit Units Featuring Scientists and Organisms Studied

Visitors had very positive responses to many of the models and the interactive components. They were able to describe some of the fundamental ideas behind many of the units and said they enjoyed learning about the organisms. However, some glitches in the interactives, the length and complexity of the text, and some ineffective design components of the exhibit needed to be modified to improve the exhibit.

HIV

Overview: HIV was the first unit near the Explore Evolution Exhibition entrance. This unit included a brightly colored, three-foot diameter model of HIV with a pull-out panel, a lab bench with sliding bar interactive an computer screen interactive, a graphic VIST HIV evolution panel, and a park bench with reading cards. Of the 16 visitors observed, almost all the visitors spent time looking at or touching the model, and the majority of the visitors interacted, at least briefly, with the lab bench activity or computer screen interactive. Visitors in groups discussed what they were doing or seeing with their companions. Most visitors also spent time looking at the informational panels, including the VIST evolution panel. Few visitors spent time at the park bench.

Strengths: Visitors said they liked the colorful, touchable HIV model and took time to read about it. "It's cool," exclaimed one male youth. The main idea behind the replication screen of nucleotides was clear to most visitors, including youth, from their descriptions. With respect to the HIV unit overall, many visitors could explain the work of the scientist and its importance, that HIV can be fatal and that it evades the body's immune system because it replicates and evolves rapidly. As one youth explained the meaning of the exhibit, "As a person gets older, the virus mutates and gets worse. Changes happen faster than the body can get the virus out." Another youth said, "This is the basis of the big picture for the rest of the animals."

Weaknesses and suggestions for change: None of the visitors were able to use or understand lab bench activity, and some said they found the sliding bar frustrating. The vocabulary and text for the interactives were hard for visitors to understand, and we recommended that the lab bench activity and the text be simplified. As one female adult said, "The hardest thing is the vocabulary. I had to go back and reference the words."

Diatom

Overview: The diatom unit included a large, touchable model and a lab bench with a microscope and a computer multimedia activity, and a graphic VIST diatom evolution panel. Visitors were drawn to the model and the lab bench, spending time reading and working with the interactives. Over three-quarters of the observed visitors looked into the microscope to see the diatoms, while one-third stopped to view the diatoms on the interactive screen.

Strengths: Visitors said they liked the diatom model, and the diatom photographs, and also took time to use the microscope to see the real diatoms, which they said helped them better comprehend their tiny size. Most visitors could explain the work that these scientists were engaged in. One female youth described Ed Theriot's work by saying, "He studies algae in Yellowstone Lake; he studies species evolution." Another female adult visitor explained, "This is the only place they find this particular [diatom]. And it appeared in a short period of time. 4000 years is rapid evolution."

Weaknesses and suggestions for change: While most visitors understood the primary research significance of this unit, one adult female thought the main point was just "the fact that these are found no where else," and one 13-year-old boy described the exhibit as talking "about the difference between pollens and the stuff found in the mud in ponds." With respect to suggestions for change, visitors had some difficulty using and focusing the microscope; we recommended it be simplified. Technical glitches in the interactive screen also needed to be rectified.

Ant/Fungus

Overview: The ant/fungus unit included a graphic VIST ant/fungus evolution panel as well as a lab bench with three videos and a Petri dish activity. One-third of the observed visitors stopped at the lab bench and sat down to view one or more videos in their entirety, or viewed a portion of a video. Over half looked at the Petri dishes, and over half looked at the VIST and/or lab bench panel.

Strengths: Visitors remarked that they were surprised that ants worked as farmers and how they work together. Visitors said they enjoyed watching the videos and many stayed to view them in their entirety. One adult explained the exhibit by saying, "This is a small version of everything that happens on earth. How one species could not live without another."

Weaknesses and suggestions for change: The Petri dish activity was poorly understood by visitors and we recommended it be simplified. One female adult asked about the Petri dishes, "What are we trying to get across? What are bacteria defenders?" She had read some of the text aloud to her children earlier, but it was not enough for her to be able to understand the main idea. In addition, while visitors mostly understood the relationship of the fungus and the ants, they had difficulty understanding the roles of the other two organisms. They did not understand the co-evolution, and we recommended increased emphasis of this in the text.

Fly

Overview: The fly unit included a lab bench with an interactive audio activity, a panel with fly specimens to view under magnifying glasses, and a graphic VIST fly evolution panel. Over half of the observed visitors stopped to view the specimens in detail, and one-third sat down at the lab bench to interact with the activity, spending a few minutes working with it.

Strengths: Visitors said they found the fly unit interesting and said they liked looking at the map of the relationship of the age of the islands and the evolution of the flies. Some of the adults and some youth understood the idea of females choosing males. One youth described it, "Male flies are elaborately designed to catch females' attention because the females are particular about who they mate with." Some of the visitors said the main point was the "different sounds flies make when they are in the mating process." Many visitors looked at all of the different fly specimens. One adult male exclaimed, "God help me, they are even beautiful."

Weaknesses and suggestions for change: Some adult visitors said that there was no interesting question to draw them into this exhibit. The concept of sexual selection was not well understood by visitors. When asked what made this an interesting research topic, a few visitors said they were "not sure." We recommended contrasting the concept of sexual selection with natural selection. Many people experienced problems with the interactive audio activity. Some thought the recording time was too long, and some people said they were uncomfortable viewing and learning about flies' mating rituals.

Finch

Overview: The Finch unit included a movable globe showing Darwin's voyage, a lab bench with a beak measuring activity, a diorama and flip books, and a graphic VIST finch evolution panel. Visitors found this unit attractive and easy to use, with the greatest proportion of visitors choosing to interact with some manipulative at this unit. Two-thirds of observed visitors rotated the globe, two-thirds flipped the pages to see the beak size variation, and one-half used the calipers to measure beak size.

Strengths: Visitors said they liked the finch unit and understood that the beak size varied because of seed availability. One female youth described the research, "[the scientist] looks at variation in response to the environment. At how the finches' beaks are smaller in the dry years and larger in the wet years." An adult male visitor said he especially enjoyed the "connection between beak size and seeds and the wet and dry seasons." Visitors found the giant calipers in the beak measuring activity were easy to use and helped clarify the concepts presented. One female youth declared, "It portrayed new information in a way that was easy to understand. Beak size was easy to measure." Some visitors commented on the short time frame of evolutionary change.

Weaknesses and suggestions for change: We recommended that the beak measuring activity needed minor adjustment because it was difficult to line it up exactly. In addition, the flip pages needed to be modified to improve visitors' understanding. The globe also needed clearer markings to make it easier to use.

Human

Overview: The human unit included a large two-sided gene/mirror wall, a separate reading panel on the scientists' research and a graphic VIST human evolution panel. Over half of the observed visitors stopped at the wall to either look into the mirror or look over the "find Pääbo" sequence.

Strengths: Visitors said they found the human unit very engaging and were observed interacting extensively with the components. They were pulled in by the content and wanted to know more. Even younger children were observed enjoying and participating with the mirror/gene wall. Most visitors, especially children, enjoyed finding Pääbo. Most were able to understand the close genetic relationship between humans and chimps. As one adult explained, "This is the core of our structure as humans. This shows how similar our basic structure is to chimpanzees." Another visitor, a 15-year-old female, remarked, "Shows how we're related to monkeys and chimpanzees and to show that evolution did happen, even though some people think it didn't." Many visitors also enjoyed seeing the mirror with the chimps and their foot and hand prints and interacted with them. The flip panels were also well used by both adults and children.

Weaknesses and suggestions for change: Some individuals had difficulty understanding the DNA similarities. As one visitor asked, "how can there only be 1% difference between humans and chimps when we are so obviously different?" Although this was the question we wanted them to ask, we recommended the copy be strengthened to more explicitly address that question.

Whale

Overview: The whale unit included a case comparing modern and fossil whale skulls, a lab bench with bone casts and a graphic VIST whale evolution panel.

Strengths: Visitors said they enjoyed the whale unit. They understood the work of the scientist as "finding the ancestor of animals" (male youth) and "studies fossils" (adult male). One adult male visitor said, it "demonstrates the nuts and bolts of evolution." Many visitors took time to view the VIST panel and could explain its meaning.

Weaknesses and suggestions for change: The interactive for this exhibit included comparisons of the ankle bones and skulls of several specimens. Most visitors did not understand the comparisons of single pulley and double pulley ankle bones of the wolf, hippo, and whale, and were unable to grasp the rationale for comparisons. Some visitors did not know that the dolphin is a type of whale and were confused by the skull comparisons. Working with the PI and the exhibit developers, several very specific suggestions for changes were developed.

Overall Responses

When asked "what was the point of the whole exhibit?" all of the adults included "evolution" in their answers. Responses included, "Evolution and change and research" (adult female), "Evolution of all species, span the gamut of finches, chimpanzees, whales, trying to debunk creationist theories. This is how we evolved" (adult male). Some remarked on the variety of organisms, "that evolution occurs in tiny organisms and large mammals" (adult female). Just over half of the youth identified "evolution" as the primary theme of the exhibit, and some were able to describe succinctly the main themes of the exhibit. For example, one female youth said, "To describe the different evolution of different animals." The other youth focused in on the different research of the

scientists or singled out one unit, such as the virus, "the nature and dangers of viruses and things."

Some of the visitors noted the interactives and said they would like even more hands-on activities. Parents in particular commented on the need for less text and more activities. Given the exhibit's placement at the Science Museum of Minnesota for this prototype evaluation, visitors may have been comparing this exhibit to the more interactive exhibits typical of a science museum, rather than a natural history museum. Five of the six partner museums, where the Explore Evolution Exhibition will be on display, are natural history museums.

V. Conclusions

Observing the visitors and hearing their comments demonstrated aspects of the exhibit that worked well and connected with visitors as well as aspects that did not work as well. With respect to visitor understanding of evolution, we found that highlighting specific research projects and the scientists working on them provided an engaging framework for visitors. In most cases, visitors were able to connect with the scientists and identify the research questions. The models were also attractive to the visitors. They spent time looking at and touching the models, and there were many positive comments about the models, particularly of the microscopic organisms. The concept of the lab benches was a strong one, in that visitors were drawn into the activities and interacted with the various components. The overall appearance of the exhibit was received positively. Visitors found the graphics attractive and generally understandable. We found that the overall design of the exhibit was effective in relaying to visitors the primary theme of the exhibit: evolution.

Aspects that were more difficult for visitors to comprehend included the VIST organizer. While these terms and concepts were designed to connect the different units in a cohesive way, few visitors recognized this. At that time, the four VIST concepts were symbolized through abstract drawings, which were themselves somewhat difficult to comprehend. Because the VIST organizer was not effective in the prototype, simpler symbols were recommended to reduce the cognitive demands on the visitors. In addition, while the lab benches were an attractive draw, visitors did not always get the benefit of learning the content behind these manipulatives. This was due to both the presence of technical glitches in the implementation as well as the difficulty visitors experienced in trying to work the different components. Consequently, recommendations for change were made for the interactives. Other logistical, mechanical, and presentation changes were suggested, including reorganization of the introductory panels and the addition of an attractive visual model (the DNA model), modifications to the presentation of some concepts, and reduction and simplification of text.

While most visitors grasped the overall theme and content of the exhibit, they did not always understand each organism and the point of each unit. Visitors differed on which organisms and related research they understood and were able to explain. Some aspects of each organism's evolutionary story, such as the idea of sexual selection with the Hawaiian flies and the co-evolution of the ant and its partners, were more difficult for visitors to grasp. However, other aspects, such as the similarity between chimp and human DNA and the idea of whales evolving from land animals, were more readily comprehended.

Overall, the exhibit was well-received and the feedback helped identify specific areas for modification. The process of the prototype evaluation, including the collaboration of the evaluators, exhibit developers, available scientists, museum directors and staff, and the project director, provided a critical and timely opportunity to identify practical ways to improve the utility and understandability of the exhibit.

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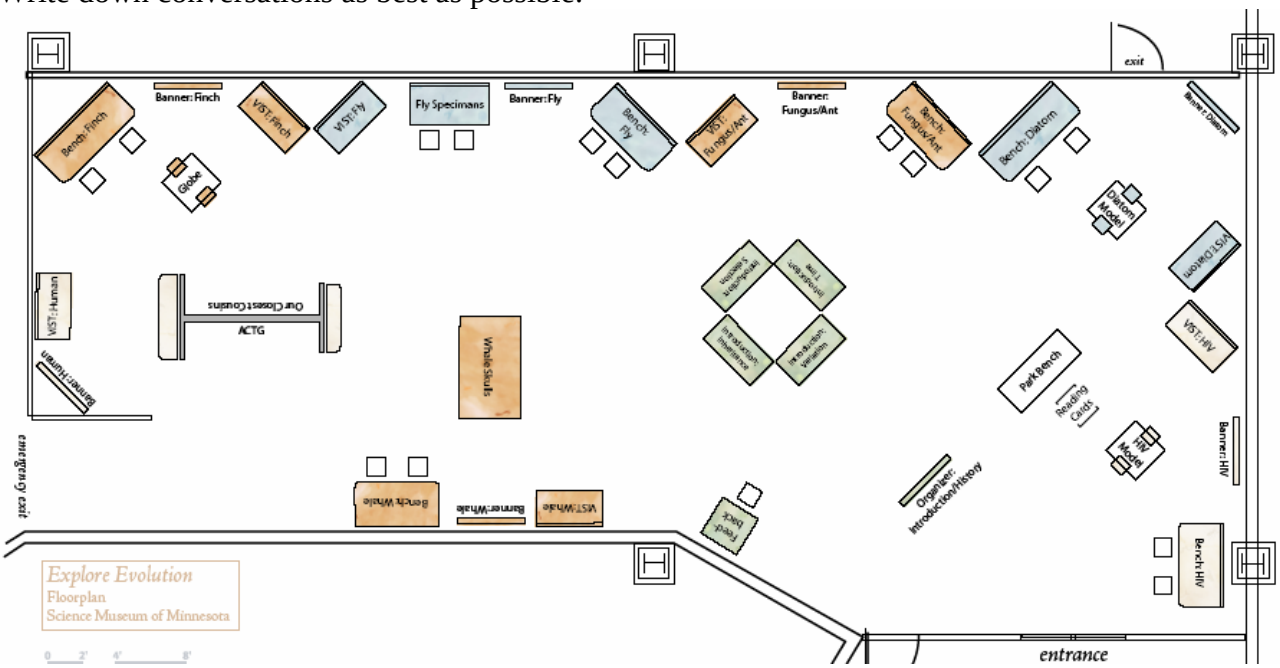
Appendices

A. Instrument and observation forms
B. Museum directors' comments on exhibit (notes from E. Margaret Evans)
C. Responses to questions on each organism and overall exhibit

Observer Name: _____ Date: _____

Focal Subject: Alone/In A Group Adult/child

Observations: Use separate form for each exhibit unit. Record where subject goes by noting path on drawing, number their stop points and record these below with behaviors coded and amount of time spent. Write down conversations as best as possible.



Start time: End time:

Coding:
Subject:
FA: focal adult
FC: focal child
A: adult group member
C: child group member
O: other
Exhibit unit:
I: Introductory panels
IV: Intro Variation Panel
II: Intro Inheritance Panel
IS: Intro Selection Panel
IT: Intro Time Panel
V: virus
D: diatom
Fu: fungus
Fl: fly
Fi: finch
H: human
W: whale
Location:
B: Lab Bench
S: VIST
M: Model
Behaviors:
MA: Manipulate exhibit
WO: Watch other at exhibit.
LE: Look at exhibit or copy
BO: Behave other (not exhibit)
Verbal interaction:
RC: Read copy aloud
TA: Talk aloud to group members about exhibit
TO: Talk other

Interview # _____

Follow-up Interview Questions (complete one set for each exhibit topic unit)

Unit: Virus/Diatom/Fungus/Fly/Finch/Human/Whale

"Now I'd like to ask you a few questions about the exhibit" (*Walk back to exhibit, retrace steps. At each unit, ask):*

1. How would you explain what this exhibit is about to a child?

2. What does this scientist do for his/her research?

3. What makes this living thing special or interesting to scientists?

(At the manipulative, ask:)

4. What did you do here?

5. How did this work?

6. What is this about?

7. What parts of this might be difficult for other visitors to understand?

8. What changes would you recommend to improve this exhibit?

Interview # _____

OVERALL QUESTIONS (complete at end of entire exhibit):

1. What was the point of the whole exhibit?

2. What questions do you have about the exhibit?

3. What would you alter or add to make the exhibit more interesting to you?

4. How else would you change this exhibit?

*At end, ask them to complete **demographics form**.*

Interview # _____

PARTICIPANT QUESTIONNAIRE
Please write your answers to the following questions in the spaces provided. Thank you.

(1) How many times per year do you visit museums? _____

(2) What is the highest educational level that you have COMPLETED?

_____ Some High School

_____ High School

_____ 2-year College or Vocational School

_____ 4-year College

_____ Graduate School

(3) What is your OCCUPATION? _____

(4) What is your zip-code or, if not living in the U.S., the name of the country where you live?

_____

(5) What kind of place of worship do you usually attend (e.g., Catholic Church, Baptist Church, Synagogue, Mosque, etc.). Put NONE if you don't have any one place of worship you attend regularly.

_____

(6) Which of the following categories best describes your race/ethnicity?
_____ Non-Hispanic White
_____ Hispanic/Latino
_____ African-American (Black)
_____ Native American
_____ Asian/Pacific Islander
_____ Multiracial
_____ Other

(7) Which of the following categories represents your age?
_____ 18-24 years
_____ 25-40 years
_____ 41-64 years
_____ 65 years and older

(8) Please indicate your gender.
_____ Female
_____ Male

Interview # _____

DEMOGRAPHICS QUESTIONNAIRE: CHILD

(To be completed by parent)

Please write your answers to the following questions in the spaces provided. Thank you.

(1) How many times a year does your child visit museums? _____

(2) What is the highest EDUCATIONAL LEVEL COMPLETED by your child's parent(s) or guardian(s)?

EDUCATION LEVEL

Some High school	High School	2-year College or Vocational School	4-year College	Graduate School
-1-	**-2-**	**-3-**	**-4-**	**-5-**

PARENT/GUARDIAN RELATION TO CHILD?	HIGHEST EDUCATIONAL LEVEL COMPLETED (Please use the above scale: 1, 2, 3, 4, or 5)

(3) What is the OCCUPATION of your child's parent(s) or guardian(s)?

PARENT/GUARDIAN RELATION TO CHILD?	OCCUPATION

(4) What is your child's home zip-code or, if your child does not live in the U.S., the name of the country where he or she lives?

_____

(5) What kind of place of worship does your child usually attend (e.g., Catholic Church, Baptist Church, Synagogue, Mosque, etc.)? Put NONE if there is not any one place of worship your child attends regularly.

_____

(6) Which of the following categories best describes your child's race/ethnicity?

Non-Hispanic White _____
Hispanic/Latino _____
African-American (Black) _____
Native American _____
Asian/Pacific Islander _____
Multiracial _____
Other _____

(7) How old is your child? _____

(8) What is your child's grade in school (First Grade, Second Grade, etc.)? _____

(9) Please indicate your child's gender: Female _____ Male _____

Evaluation Meeting 23 October 04
Notes and Summary by E. Margaret Evans

Overall Issues:

Directors' Suggestions

Something needed to draw in the visitors. The following were some suggestions

- A lack of a clear introduction and rationale for the exhibit
- DNA molecule
- Scientists' profile -talk about the people and their research
- Bring in a Darwin quote into each exhibit.
- Use the Darwin and diatoms quote to go with the Diatom exhibit
- Durability of the exhibits , particularly the Diatom
- Mutations = Death (Normally); should this be somewhere?
- PM: This is active research that is exploring evolution. Why should we care about these particular research projects. Stronger, more powerful message needed. A question? Again make questions part of each exhibit
- Strategic questions needed in each exhibit

SPECIES

- What is a species. Where is the definition of species. No uniform definition. ET doubts that they can be defined. Wrote the article "what is a species."
- PG to Ed Theriot: When did you decide you had a new species? Largely based on morphology (cladistic approach)
- Should we use “kind” instead of “species”

NATURE OF SCIENCE

- Should use the above issues (theory/hypothesis/fact) to raise visitors' awareness of the nature of science.
- Docents should be trained in Nature of Science (NOS) issues

RHYTHM

- There should be more “rhythm” from one organism to another
- The order of the activities/VIST etc. is different in each display
- You should know what to expect
- The Bench was always the pull in for the visitors
- There should be more questions to draw in the visitor
-

VIST

- Too text heavy, put in Darwin.
- Where to put Common Descent – under TIME (preferred) or INHERITANCE
- It was not always easy to find the VIST component
- Is there a different way of arranging the four initial reading rails?
- The VIST was not obvious as a common thread across exhibits

ID#	Sex	Age group	How would you explain what this exhibit is about?	What does this scientist do for his research?	What makes this living thing special or interesting to scientists?	What did you do here?	How did this work?	What is this about?	What parts of this might be difficult for other visitors to understand?	7.5 Visit: you notice these symbols? Did they help you understand the ideas better?	Are there any changes you would recommend to improve this part?
3	F	A	I would say that there's viruses that are kind of like a cold you would get, except that HIV could kill them. It can be very harmful to children, and children get HIV from their moms, it's passed on to them. I'd go over to the model, and say, it's in your body is made up of cells, these tiny cells and a bad virus attaches onto the cell, finds a home in the cell and then multiplies. These can make a child sick. You can't get HIV from someone who is sick like you can get a cold.	Charles Wood is one of the people who helped discover a blood test to find HIV, and now he is working on how to keep it from spreading.	They can save peoples lives. It's a mystery how HIV works. I came in with some knowledge of HIV. My father who is a surgeon saw people from Haiti with the mysterious illness in the 70's. At that point we didn't recognize what that was. Now we know that's HIV, but it's still very mysterious to us.	(At the mutation rate interactive). I pressed all three buttons, but I didn't see the difference between the three. (She had asked me to help explain this to her as she was looking at the exhibit) (At the Gel interactive). I didn't use this piece. I did not find it attractive. I wasn't interested in it.		(mutation rate interactive). Nucleotides -- I wish it (nucleotides) had been defined. They are always changing and replicating. Could be cells changing and mutating, being altered as time goes by.	I didn't understand what this [interactive] was, this constant change. I loved reading about Charles Wood.	I noticed them, but they didn't help me understand the ideas better. I didn't use them.	Maybe make it like a crime scene. You're telling me, not asking me to figure anything out. Who cares? It doesn't pull me in and make me wonder.I thought viruses weren't living – that they just attach themselves – viruses have an impact on cells. Viruses can't evolve because they aren't living things? Is virus mutating? Or cells? I thought viruses were a nonliving thing that invade a body; I need to know more about what a virus is. I got the most from the VIST back panels; looking at the evolution of it. That was the most meaningful to me. Note: issue is -- is it a living/nonliving issue or if it has genetic material it can evolve.
10	F	A	Probably how the HIV evolves and how it progresses and changes within a person's body. I think it would be hard, there's so much vocabulary. Would really have to simplify it. Some things that would be interesting is how rapidly it changes when you're trying to treat it and the challenges that puts forth. Possibly be an area they would be involved with studying down the line.	Studies samples of the virus in Africa, and then looks at different ways to treat the virus.	Probably because it's front page fairly new. In the states, the population that its affecting is growing. How much it changes and how hard it is to narrow down the treatment for it. It's not like a cold virus, it's so fatal.	Looks at how it changed from birth to two years. How quickly I grew and changed and how how fast it could replicate itself.	The hardest thing is the vocabulary. I had to go back and reference the words. When you're coming in without the scientific background, it's difficult. There's a lot here that would be hard for young kids.		Probably what a virus is, the context of HIV. Hard for kids to understand, in the context of viruses would be easier for them to understand. Start with something we all know about, everyone gets colds.	Yes, I noticed them. [did they help you understand?] Well, maybe a little bit. I find it helpful to have a reference.	Just the whole reference to a virus, starting with something that would be identifiable to most people and then taking it the next stage up.
14	M	A	I explained to my son that HIV is a virus that affects your body and kills your immune system so it leaves you defenseless. So that explained a lot of it right away since I understand it, I'm familiar with it, I've seen friends and relatives who have suffered from it and died from it.	He developed the blood test to identify AIDS and now he researches drugs and ways to block it or cure it.		Model: A: We were drawn it. It's colorful. Text with it is over kids heads.					Mutation buttons: Adult: Could have one button that has a longer progression that shows how it gets worse and worse over time. Watch as they mutate as they go along
14a	F	Y				Gel: 13-year-old girl: Started by reading the instructions and then read all the captions.	Girl: I'm not really sure what it's showing us, because the little captions make sense but I don't know what this image is representing.	(Asked: Do you know what these are for?) : It has something to do with the different DNA strands, but I don't know what's causing it to….			Gel: Girl: I think it would be easier if the basic facts were easier to pick out. (Asked: What basic facts did you want to know?) : Girl: Well, I don't really know much about HIV, and I'm not sure what this experiment accomplished.
14b	M	Y					(Asked: What happens? About mutation buttons) : Boy: As you go from birth to one year and two years there's more and there's more of them.	Mutation buttons: 9-year-old boy: This is how the cells grow from birth to one year to two years. I didn't read anything.			Mutation buttons: Boy: I think what kids will ask most is what does it mean by the flashing letters. I got the meaning from my dad, really, how more of this, how many cells mutated to that.
4	M	Y	As person gets older, virus mutates and gets worse. Changes happen faster than the body can get the virus out. (tracking panel - bench)	Studies differences in DNA strands and changes in DNA	HIV is a virus that kills many people and scientists are trying to stop this.	Slide and letter screen	The slide did not work well; it was hard to put the pieces together and understand what you were supposed to see. The screen with letters was clear - showing changes and mutations over time. Virus model - This was cool - showed parts - didn't read labels as much as should have but liked the model.	See above	The slide was too difficult - need clearer directions; I had to reread them. It takes too much patience to do this.	Noticed them and that they were used elsewhere in the exhibit. They did not help much - they blended into the text too much, did not stand out.	The slide again - use colorful lines to direct the visitor, to show direction
18	M	A	Left side / computer mutation model: "I guess it is different "nuclei" ...more rapid response as you hit the buttons. I guess the letters together form tour DNA process...some of them are in the process of changing. Gels: left bench: "...following the scales...looking at spaces?"	"Basically taking a blood test to detect the presence of HIV"	"In Africa its such a fast spreading disease. Understanding why there is such a rapid growth. In a 3rd world country, understanding why it is so much more relevant there than in the US."	"I guess making it easy to detect."		(Asked: What stood out to you?) : "Never seen a display about this. I studied it in college, but this makes it easier to understand."	All seems pretty self explanatory		"Simplify the language. It would be hard for someone with a child to go through and understand."
22	M	Y	"its cool" (referring to the model) "Its about HIV"	"didn't get a whole lot here...I tried to read it, but I didn't get much really."	"don't know"	"I pushed the buttons on the computer display. It catches your eye more than the slider thing. " Another kid came by and showed how to slide out the panel...otherwise I might have missed it." (referring to the model)	"don't know"	"virus and how they evolve" (dad stepped in and summarized here)	"I don't know. Not sure"	"I didn't really notice them." (note: they missed the introductory panel because they headed straight for the model)	This was a hard topic to start the exhibit with. Th virus was hard to understand.

ID#	Sex	Age group	How would you explain what this exhibit is about?	What does this scientist do for his research?	What makes this living thing special or interesting to scientists?	What did you do here?	How did this work?	What is this about?	What parts of this might be difficult for other visitors to understand?	7.5 Visit: you notice these symbols? Did they help you understand the ideas better?	Are there any changes you would recommend to improve this part?
19	M	A	I would say it is about cells and how they get infected with the AIDS virus. This is complex science – I don't understand it completely.	He works with cells, sees how cells are infected with AIDS, how they hold up with HIV and then how they are infected with AIDS…in a lab with chemicals and microscopes.	It affects the human race on such a profound level. We can't cure it, but we can prevent it. We humans don't like things we can't cure.	Found out about how DNA changes over the first ten years. I didn't understand this (the sliding manipulative), but I moved it to try to understand it a little.	(the changing sequence manipulative) You just press the buttons and it shows you the difference in the DNA strands.	(I didn't ask this.)	It doesn't show where it is within the body. (Slide manipulative) What are these strips? Paper? DNA? I think it says here somewhere, but it's subtle…If you read everything, you could probably get it and you had more than a high school education and more patience.		Add a simple explanation of the intent of the exhibit – what they are trying to tell you.
5	F	A	Screen with letters: Not geared to kids or any uneducated adults. Most people would not know what these letters are on the screen. There is no key to easily tell you what they are. Would not try to explain this to kids. [she includes slide interactive in this comment]	Figuring out why some people get HIV (3 out of 10 cases come down with it in the example); study mutations and their affect on DNA	HIV is a world plaque, it is not remote, it is a world problem	The slide model on the first panel was very difficult and hard to see. I had to reread instructions; kids would not get this. The virus model was really cool; good to see parts of the virus.	The slide was difficult to use. The pull out was hard to pull out and then I was not sure I was supposed to do this. But it was interesting to see inside the virus and this worked well with a black and white illustration showing the virus and its parts. This model would really draw kids (not the slide)	First panel, too difficult. Virus model much easier to understand (parts and how they work)	See above	Yes, I saw these and these were interesting (visitor points to the illustrations, not the generic symbols). They were in each exhibit and so saw a pattern, but the pattern did not clarify anything; indifferent to pattern.	Simplify and clarify the beginning.
11	M	Y	This is the hardest to explain that "really really small differences can make something in your body go really wrong." It's hard to believe because you can't see it	Works in a lab trying to figure what trait in a virus can infect the body	Probably because of the larger impact on human life. He thinks he might go to college to study AIDS research	Mutation manipulative). Differences in mutation rate from birth to one year. Liked the repetition of the nucleotides. Helped you understand your biology	Repeats kids' DNA. Kind of how it moved and change and the mutations change.		Terminology. I never understood genetics that well, nucleotides –talked about them in biology		Add more—because I like this part. This is the basis of the big picture for the rest of the animals. Talk about genetics differences of all the animals.

ID#	Sex	Age group	How would you explain what this exhibit is about?	What does this scientist do for his research?	What makes this living thing special or interesting to scientists?	What did you do here?	How did this work?	What is this about?	What parts of this might be difficult for other visitors to understand?	7.5 VIST: Did you notice these symbols? Did they help you understand the ideas better?	Are there any changes you would recommend to improve this part?	Summary
3	F	A	Yellowstone Lake is near my house. I'd say little organisms live in the lake, little bits of algae. Have you ever seen small things in the lake? Pond scum? It's made up of thousands of these [diatoms]. I'd show the kid the model. The model is one blown up really big. This diatom is only found in this lake, and they think that it was first born there [in Yellowstone Lake]. But this was not engaging me, it's not asking questions. This would not be interesting to kids. Need to help scientists solve the mystery.	Collecting diatoms. Trying to find out when they first showed up.	I don't know. Well, this is the only place they find this particular one. And it appeared in a short period of time. 4000 years is rapid evolution. Yellowstone is a special place.	Tried to get it to work, but it gets stuck. Didn't close. You're not asking me questions.			Why are they doing this research? You are missing the rest of the story.		Need to create the mystery – translate the scientists passion to you, the visitor. Ask questions for people to figure out.	
23	F	A	"I would first start to point out microscopic size and then evolution. Then that it shows life in ponds."	"He checked to see changes in diatoms as time went on so that he could see changes in climate."	"So they could make predictions for the future. Figure out patterns. If you understand the past you can work with the future."	"Looked at the computer." Multimedia "is good it grabs kids attention. All visuals do."	Microscope: 400x saw it well. 100x blank screen Multimedia: easy to see how pollen and diatoms changed over time.		All of it made sense. But people with younger kids may not have the time to figure it all out. A lot of information and young kids have short attention spans.	Forgot to ask it at diatoms. Asked at Fungus.	"Switch panels (labels) around on diatom model" so that the explanation of the model is the first thing you see and the pond scum (?) is second. Put punctuations next to big words.	
22	M	Y	"I think it's about how pond scum evolves in specific lakes" (dad intervened to answer the question	"Didn't read it"	because you can see some specific evolution in places (dad intervenes)	"Hard time using the slide show to get to the interesting part" (organisms). Liked using the microscope a lot.	"don't know"	"pond scum is unique to how it appears in places."	"I think it is an easy idea really."		Needs the names on the slide show larger so you can easily see the diatoms come from different places. Put diatoms up above on the panel so they are easy to see. (the interactive makes them hard to get to the interesting parts. (dad comment)	
4	M	Y	About diatoms in Yellowstone - they have changed and are differe here.	Study changes in their structure	It changed in just 4,000 years	Looked at microscope and the screen	Microscope worked will except the second one is harder to focus; screen is interesting but under "Solve a Mystery" the diatom did no change very much; they pretty much look the same.	How they changed in a short time.	Can't see changes in diatoms.		More distinct changes and adjust focus on second part of microscope. Other than these things, good.	
5	F	A	This is interesting because I am from Michigan and the model is nice, but hard to explain to a child.	Freshwater biology	These are only found here, nowhere else, Yellowstone is of interest.	Compare and contrast; could start with Microwonders and if visitor had time could look into microscope.	Enjoyed the microscope and found it easy to use (has experience)	The fact that these are found nowhere else.	Found this part of exhibit easy to understand		Not really. Note: lost the connection between virus and diatom - could see other exhibits - didn't make sense with virus and diatom	
21	F	Y	The climate can change how the diatom was. If it is a cold, wet climate it's different. If the climate warms up then it changes	He studies algae in Yellowstone Lake; he studies species evolution	It seems related ... it's a basic organism, you can find out more about it	She looked at the model (not the lab bench). It's really interesting with the different ribs. Really interesting to see the model	Did not do manipulatives. Prefers to look at the exhibits. Likes the Discovery channel, likes to read about biology and watch it on the Discovery channel	Not Applicable	Felt that the language would be difficult for her friends to understand. They don't read books like she does --- and they don't watch Discovery channel	Yes, she noticed them at each exhibit, both the chart and the symbols. Thinks that they help.	No real changes. Liked the layout, it looks interesting and catches your eye.	
Subjects 17, 17a, 17b FA and two MY			Diatoms' Diatom Vist panel 17 - read panel to group. 17b - What is a diatom?? 17, 17a, 17b looked for answer on panel, but could not find it. 17b - suggested putting definition on blank space on panel. Group understood characteristics, but not what it the organism is. Diatom model17b - found what a diatom is. 17 - reads aloud "Pond scum" 17a, 17b - like model a lot and touch it. 17b - says "It has ribs like me" 17 -suggested that move model to front of exhibit or define diatom on first panelDiatom screen 17a - no problem with reaching, using mouse or red button. Group went to solve a mystery - got to the multiple cores(?) but could not get anything to click (17b saw x to exit) tried multiple times and even sent back to beginning and couldn't get anything out of it. 17b - said that he didn't get it and wondered what pollen was doing ther 17a - tried but got stuck. Group was frustrated that they could not find or solve the mystery. Group next went tomicrowondersand looked at the different pictures - enjoyed the pictures - but no information beyond that.										
29	M	Y	"It talks about the difference between pollens and the stuff found in the mud in ponds Explains what all of it is."	"They pulled out stuff from mud and looked at it to see the difference."	"Because it shows how much change was in different years. It explains a bit about lakes and how different they were."	(he read, played with microscope and the interactive, looked at the model)	"When you looked at the pictures and the model...then you could see what was in the microscope."	"What diatoms and pollens really are."		"I looked at the panel (over the bench) to see what it was about."	"None really. Microscope works ok. Software looks good. I might make where you are to click active (so you can tell what to do)"	Boy thirteen spent quite a while looking at all parts of the diatom exhibit. Specific comments about microscope said that it was ok to focus. He thought the 100X did not have as much focus as the other part. That the other slide was "off to the side." "Cool" was his over all comment.

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16	M	Y	Information on what ants do.	"Takes leaf cutter ants and puts them in different containers that have leaves, dirt, and other things and do different experiments."	Something just inspired him	Looked at the movie.	Movie "attracts attention" "It's good."	(I asked if he could tell me what the petri dishes were about.) "You put ants into them for your experiments" (He was unsure of this.)	Reading some of the text. It varied though.		None
23	F	A	It's talking about ants and the way an ant is a farmer. The earliest farm and how ants make colonies. The remarkability of ants	He studies ants and determines how they make crops and the jobs of different ants and the different foods. How they pick out bad fungus from the good.	"Their organization and ability to harvest and grow crops. The self containing colonies."	Looked at the video	Liked visuals. The TV screen was good. Good for kids		Pointed out the petri dishes and asked "What are we trying to get across? What are bacteria defenders?" She had earlier read some of it out loud to the kids, but it was not enough for her to get the main idea.	Didn't notice the symbols. Did see time in the one exhibit (diatoms).	Didn't answer this question her youngest grandchild needed attention.
19	M	A	This is about the coexistence of different plants, insects, species – how they help each other survive. This is a small version of everything that happens on Earth…how one species couldn't live without the other.	He is watching the ant co-exist with bacteria, microfungus. His research involves taking one of the four elements, one partner out of the equation to see who's helping who between the four partners.	Interesting in that the deeper you look at the relationships between lifeforms, the more you realize how important everything is to everyone else. Like if you took oxygen out of the rainforest or cutting trees down…It tells us we need to be careful as a species because we are so powerful as humans.	Watched the video.	I didn't do anything. I just watched when someone else started it. I'm assuming you just push the buttons here.	* I didn't ask this (I thought his question 3 answer spoke to this)	The petrie experiment would be hard to understand without watching the video. It's self-explanatory with the video.	Yeah. I looked at those, they helped, but it took until toward the end to see what was going on.	Nothing…maybe a sign that says "Watch the video first."
1	M	Y	(I took out the "to a child" part.) Mold growing on ants and how a fungus fights off…	I have no clue…Studies the ant and they protect the little...	How the ants react to stuff growing on their fungus and then they cut off the infected fungus and stuff is growing on their backs.	Watched the video "Ant Farmers"	* I didn't ask this.	* I didn't ask this (his answer to 3 answered this)	The bacteria and the fungus part…how the ants react to it. (I asked him if he meant the Petri dishes part and he said "yeah").	I didn't really know what they meant.	More explanations of what these (the Petri dishes) are.
15	F	A	I would talk about how the life cycle evolves different creatures ...they work together ....the whole idea of nature propogating without the help of man.	I would talk about ..."how scientists collect informatiohn. the tools he uses, the special containers (petri dishes)...the time it takes to develop.		Listening and reading...some touching.			Its a lot of reading. I was interested here because I garden....	No	The buttons are not working. It is nice to be listening (to audio about the ants). There is a variety of approaches here...that is good. There are touchables, it is interactive. The benches lets kids "get their move needs addressed."
14	M	A	Adult: How over time animals and insects have developed the ability to use things within their environment to live with and use to their advantage. Insects that farm, pretty amazing.	Adult: studies fungus and bacteria, ants. Looks like he studies symbiotic relationships and how they work.	Adult: What the ants have evolved into, they take leaves, and make farms and grow fungus, it's all interesting about how that works. Pretty advanced evolution for a small insect like that.	(Second) **What did you find surprising?** Adult: Just how advanced the whole process seemed to be. Insects that we consider mindless have developed instincts to the point it seems like this is all planned.		(Petri dishes) Adult: I really didn't understand that at all, what's in the dishes.	Adult: I think these exhibits are over younger kids' heads, even my son who is a good reader. Unless you can read really well you would have to have a lot explained. The basic science of it. It's good for someone like me or an older child.		(1st) Adult: You guys do pretty darn good here. (3rd) Adult: When I first came up to this exhibit, I had a hard time putting everything together for some reason. My first thing, what is this all about, I didn't get it. It didn't come to me really easily. Maybe if I sat down…(4th) Petri: Adult: They have these experiments here and its not really clear. It should be clear. Something right here should explain exactly, a little clearer, what this is. Maybe if you read through it all it would be clear, but to a child it's all Greek. Too much text for a child and even some adults. I didn't put it all together.
14b	M	Y				(First) Unique partnerships (video) 9-year-old boy: See how the fungus grows and how the queen makes new farms, takes a little bit of fungus and makes a new one. (Third) **What did you find surprising?** Boy: How long the fungus has been around					(2nd) Video: Boy: pretty cool I think, even for little kids, maybe five might understand it.
17, 17a, 17b	F, M, M	A, Y, Y	Film: 17a - started with ant farmers - watched it carefully and enjoyed it. 17 and 17a - trying to figure out petrie dishes - could not do it. Guessed at it - bacteria attacks ants???? Said that they did not know what they were looking at. 17a - watch ant farmers also and engrossed. Then 17, 17a, 17b watch unique partnerships. 17 and 17b go "Oh that's what that means." Now the dishes were clearer. 17b wonders why scientists are studying this (ants) rather than how to cure cancer. When asked if one button should be put in front of another (ant farmers before unique partners) - said no. But all three suggested that visitors watch unique partners before trying to understand the petrie dishes. Fungus visit - 17a - noticed that first farmers were ants, not people. 17, 17a, 17b looked but no comments.								

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13	F	Y	About the different shapes of head, antennae, and wing patterns of the male and the female and why their different.	He watches the flies mate.	The way they kind of like dance.	You watched the fly do their little dance mate thing. It was kinda weird.	It was kind of slow, it didn't narrate to tell me what to do. I didn't know what it did till I read a little bit more.		This (models) is pretty easy to understand, but this (multimedia) is hard to understand because it didn't tell you what part of the body it was using or like what was a drop of water.		It would narrate it for you – have it tell you what to do.
10	F	A	Mating selection and how over time, certain characteristics became more attractive and over time, changes happened, and natural selection. Similar to humans sometimes.	Studies mating behavior.	I suppose what it tells them about evolution, life of species. I made the comparison to humans.	Compared the male and female and noticed, it played on how females, well, males became more and more elaborate because that's what attracted females. Looked at different characteristics.			Depends on the age, who's looking. Whole thing hard for younger kids. Things they are not familiar with, not a lot of background. Problem with the whole exhibit. My fifth graders would probably walk around and be in and out of here fairly quickly, unless we were doing a specific unit, but we don't do a lot of that at this level. Very abstract concepts for younger kids.		I do think kids enjoy videos, I think the vocabulary and language has to be simpler. The vocabulary here is very sophisticated.
5	F	A	Shows how one becomes many; I would use the graphic to help show this.	Studies these fruit flies and how they have changed	Rapid change	Looked at each specimen.	Easy to see. The graphic tree with photos was very good. You can easily see the changes in flies and their relationship.	Male/female differences and why there are differences; were easy to see and understand;	Very clear except for the leg hairs (fuzzy) but the concept was understandable		Redo leg hairs specimen
21	F	Y	It's about flies, about how they change. They came to the island and once they were there they all spread out because there wasn't any competition. Because there were things they adapted to.	Didn't look at this panel	It's interesting that the flies can change so much and that they live in the same area	**(Fly Specimens)** Looked at the flies. The females are plainer than the males		Male flies are elaborately designed to catch females attention because the females are particular about who they mate with	Pretty easy to understand		
15	F	A	This is information about how species are created. I am not sure if I would tell my kids about sex lives. I would say that they make friends my singing a song.	I would (tell my kids) about how scientists are not always just in the lab. He collects. He wears gloves. He has to find animals to collect...so he has to find ways to attract them. He has special equipment.	"I was interested to know he (kaneshiro) changed carrer by doing a summer job...orginally he was going to be a physician.	Mostly reading. Looked at the pictures. It made me think about Hawaii.			For a child under 10 it is a lot of reading. I have an eight year old that would zone out here. Geared towad an older reader.	Didn't notice these	Attracted to the scientists face. Liked the bench and the visual.
12	F	Y	About the flies? How they um, how they mate and how different kinds of their wings are different.	He um examines flies and tells about them.	Um, how they explore and um get to know a lot about flies.	I looked at how the sounds they make, wait, no, yeah and about mating…I mean how they do songs and dances and stuff.	* I didn't ask this.	* I didn't ask this.	How they…How would they feel? Um, it would be hard for them to know how they dance, do songs.	Yeah, umm…What I learned about it? Yeah, this helped me understand (points to selection) and this did (points to inheritance).	What I would change about it? I would probably change, probably how they mate. * I asked "How would you change that?" I would just…. * I asked "Is there anything about it that made it hard to use or hard to understand?" Umm…umm… * I say "No?" She nods.
24	M	A	Explaining how not just flies, but all animals can change over a long period of time. Who they decide to mate with. I guess I would explain it in terms of having them think about their own parents and things that they have received from their parents, the color of eyes or those kinds of things that are given to the children. Just like flies when they mate are their offspring are given characteristics in the same way. Over time those characteristics are passed on through the years and you can get some pretty strange things going on.	Not sure what you mean? What is his research about? Did you pick up on a scientist? I didn't focus on the scientist. As I was going through I didn't …(pause) I was looking at results and comparison, and focusing on that, rather than on the process and the person that was doing it, even though he is pretty prominent when you look at that first display (Lab Bench).	Because it is so easy to see this process up close with fruit flies perhaps its, I'm not sure maybe because of the changes from place to place. Like for instance this one where they talk about the two species with almost identical DNA and they look quite different from different parts of the world. I think it is fascinating, it's like the Galapagos Islands, and you look at at the Hawaiian islands and you see the progression. That, to me was interesting. The progression of the fruit fly species from older islands. It seems to be logical.	**What would you say was the most surprising thing you learned?** Well, the rituals the males go through in the fruit flies to attract a female. It's interesting, not necessarily surprising because I have seen it so much in other species big and little. I didn't know that about the fruit flies. I am fascinated by the difference in DNA, to me having two fly species that have almost the same DNA at can look so different. I guess that kind of peaks my interest.	**When you looked at the flies here (on the right side of the fly specimen table). Did you find it interesting, useful. I thought I saw you peering around it? Why?** When you look straight on it does look like they are the same size. You have to look to the side so you can see the obvious change between the two sizes. I wanted to see the actual size first because when you first look at it from this view they are about the same size. Then you realize no no no this is a lot smaller. So if there was some way when you first approach it that you could see obviously that this one is a lot smaller. Then some how magnify it. If you wanted to see it up close because I don't see the benefit of seeing it up close. Unless you chose to…you are curious. That seems to be the thrust of this particular display (referring to text around the box) is the difference in the sizes. So you see oh my gosh, how much bigger that one is.	**What was your opinion on the flies over here (the fly comparisons next on the left side of the fly specimen table)?** This was interesting (to see them) up close, I couldn't spot the forked hair on the tip of the male's leg. I am not sure if it was the angle or not. (another visitor who was actively looking at the time we were talking said he couldn't see it either.)	Friend said, "Why should we be interested in studying flies?") That is true Everything needs a hook. There could be something like a even a larger hook that is in with the fly thing(banner) maybe even that question. A hook to get somebody to go into more detail. And I think that happens in other displays in museums, where you are not, I mean you don't have a hook, you are seeing some interaction stuff going on here and maybe you do that, but you are not involved in the whole, connecting all the pieces together. For kids, they are going to be drawn to the interactives. You want to draw the adults in too. Need something for them.		**Do you have any other suggestions about things we should change, other than the things we have talked about?** Here's an interesting thing. He (another visitor) was looking at the fly dancing thing (referring to multimedia). And I never got that far. It seemed to be a little slow getting to that part. I stopped before I saw that. It actually has them interacting. It showed the female at first and then was slowly moving and I lost interest in left. It's funny because I wouldn't have known it was there until I looked over and saw it (another person was operating the multimedia as we talked). (The interaction looked interesting to him, but the build up lost his interest.)

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24a	M	A			Flies are everywhere. You think of them as pests. When you see them through these magnifying glasses you can see detail and the differences of so many different species and between male and female. God help me there is even some beauty to them. The hands on stuff I think appeals to kids and the reading stuff to the adults probably. It's interesting too that there is song and dance(in fruit flies), just like in humans, in terms of mating. There is music and dance and also different types of duties. Attraction kinds of things.	**What would you say was the most surprising thing you learned?** Fruit flies that we are familiar with are tiny like inside there. These are so much bigger and you can see so much more even with the naked eye. I wondered why. (they are bigger) Hawaii has all this lush tropical and they are isolated and so forth, maybe its got something to do with why they are bigger. But there has got to be some reason why they are so much bigger.	**What was your opinion on the flies over here (the fly comparisons next on the left side of the fly specimen table)?** I couldn't see the forked hair either (on the tip of the male's leg)		Why should we be interested in studying flies?		
18	M	A	It's about hearing different sounds that flies make when they are in the mating process. Also having the opportunity to make sounds similar to flies. "It's showing the mating process. The different movie clips show different dances flies do to attract females. "	"That's a good question."	(shows) "how some flies end up on different islands." "Curiosity"	**What stood out to you?** "I'm glad we don't have those flies here."			"All seems pretty self explanatory,"		**What changes would you recommend to improve this exhibit?** "Red button…." I didn't know exactly what to do with it. How to start. Put directions down" (next to the button)
28	F	A	(3rd) FA: How that they, it changes from year to year (5th) FA: Correct, better word.		(1st) FA: I have no idea. Seriously, no idea. This one didn't interest me at all. The only thing that probably interests me is that other things change (3rd) FA: the dance changed with the generations. That part did.	(2nd) FA: I just read stuff. I don't like looking at them things (the video screen). I'd rather just read what's on the stuff, like the whale one. I liked that one because it doesn't have one of these. FA: I guess if we had more time. But a lot of times when we come here we have kids and stuff and it's hard to just stop and sit and read or do that stuff, so…	* I didn't ask this.	* I didn't ask this (repetition with question 1).	(1st) FA: Little kids wouldn't understand this at all. I mean, they understand I guess what it is, but… (3rd) FA: I think having a picture like this (drawing of two flies on lower panel left side), but I'd like if they have the real picture. I think that would interest little kids more that just seeing this. They might come and play on that (the video screen), but I think they would play…We were with some little kids today and that's what they do, just play. But I like to see the real thing. I mean, like, maybe encased and you could see it.		(none)
28a	F14	Y	(1st) F14: How Hawaiian fruit flies mate						(2nd) F14: I think it's just the little kids, they won't know it and stuff.		*** What about this (the video screen/computer)? Did you find this easy to use? Did you find any problems moving around with this (the mouse)? (1st) F14:** Nope. I thought it was easy.
28b	F11	Y	(2nd) F11: Yeah. (4th) F11: Generation to generation	F11: Got two flies maybe, a boy and a girl. (nobody had anything else)	(2nd) F11: the dance.	(1st) F11: I did…me and (sister's name) looked at these, but we didn't finish that one cause we kinda left.			(4th) F11: Like a real fly.		*** What about this (the video screen/computer)? Did you find this easy to use? Did you find any problems moving around with this (the mouse)?** (2nd) F11: Yeah, like our laptop.
27	F	Y	I would first start with the fly specimen table and the body parts and talk about the many different types of flies. Then talk about where the fly came from. Or maybe the VIST Panel first because it explains it more, but not the multimedia panel.	Didn't get anything about the scientist. So many words kind of small. I don't like to read as much as look at pictures. Parents might read to the kids.	Large size of fly. Not sure what the fly does that makes it so important.			What stood out to you? The body parts were great. Body size very interesting. Kids see flies everyday and don't know what the parts look like.	I want to see more hands on. VIST not interesting, nothing to draw you in. Want models showing the changing flies. The pictures are not that great.		
27a	F	A	27A Evolution of flies and how they came about and different flies.	27A didn't pay attention to scientist either.	27A the wing patterns.						

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16	M	Y	"It's about different types of finches and how to compare them." About "how many different populations there are." "About DNA." "What they eat." (What finches eat)	"He would set up a net and try to catch birds and get DNA"	"Birds in general." (are interesting)	"I liked spinning the birds." (model of finch) I asked "Did you expect it to do something?" He said "No, just spin."	"Shows how they measure the beaks." It's hard to turn the red knob." (on the calipers) (As he showed me how hard it was to turn he then realized that you were suppose to slide it and not turn.)	"birds and beaks"	There is a lot of information. A lot to read.	Did not notice the symbols, neither did the mother. Mother went back to first panels and came back later and suggested they be near the entrance as it ties everything together.	None
1	M	Y	The difference of what finches eat, how they evolve and how their beaks work.	They measured the beak size of different finches during different seasons. Finches at the same time on the same island have different beak sizes.	About the different size beaks of finches…I'm not really sure.	Measured the beak size, read what it meant, looked at the model.	Adjust the tongs to the read lines and compare it to the other finch and see how big a beak compared to the other finch.	* I didn't ask this (I thought question 1 answered this).	Why the finches have different beak sizes.		A little bit more information.
13	F	Y	It's about the size of the birds' beaks, what's going to happen like in a wet year, or a dry year. It's kind of hard to explain.	Study birds and their beaks, in different parts of the world.	Their lifestyle and their beaks. They are heavy and they use it to crack seeds.	Measured their beaks.	A little bit. The lines tilted funny so you couldn't get it exactly.	About the finch beaks and how they measure them.	I don't know.	Not really.	A little more about the dry year, why it's important to study their beaks.
21	F	Y	They went to the Galapagos Islands, it's like the flies, all of them are in a small area and they spread out and they changed as they adapted.	Looks at variation in response to the environment. At how the finches beaks are smaller in the dry years and larger in the wet years. Looks at how different they were from the ancients.	Variation is interesting	(GLOBE) Darwin's voyage. It was interesting to find out the different places he stopped at to find the different species.	(CALIPERS) That worked really well. It portrayed new information in a way that was easy to understand. Beak size was easy to measure. She didn't know that was how the scientists did their work.		How they evolved so differently. It should be more in-depth.		Need more detail to understand how they evolved so differently.
25	M	A	Natural selection, animal adapting itself to the environment	Study finches in Galapagos, based on Darwin's 1800s research	What kind of progress has been made since then (Darwin)	Globe: traced route on globe, interesting. Calipers: These worked fine and enjoyed doing it. Especially enjoyed flipbook and the connection between beak size and seeds and wet and dry seasons	Hard to find the START point on globe, but did find it.	See above	The Galapagos Islands might be highlighted to make it easier for kids to find where it is	Did notice them and especially liked the panels in the middle that explained them. They were just there, did not help organize my thinking.	See above comments - that was it. Liked the finch exhibit
9	F	Y	Showing how even though there's like two birds and they're from the same place, and they're like the same species, they don't look exactly alike. Like in this, like the finches their beaks are different or like their size, just like humans, even though they're all the same thing, they don't all look the same.	Go around to I think it was the Galapagos islands, and they like measure the beaks and weigh the birds and just look to see how different they are, just compare them.	Don't know…Maybe that there's so many different kinds…like they were, and they've all like evolved, and like adapted to their surroundings.	I did the little measuring beaks thing, and twisted the twisty thing and read most of it and then I read some of the stuff around the globe and looked at the globe, and then I looked at the graph (of the different finches) and looked at what the different ones do and what they looked like and differences in them.	* **Did you have any trouble with the measuring part here (the calipers)?** No. Cause it was pretty easy to read because it moves with it (the ruler). * **What did you think this represented (the pages)?** I didn't look at this, I tried to, but I didn't really understand. Like I read that (the climate lower panel text) and I looked at this (the pages) and just didn't understand that.* **Do you think it would have helped if they had pictures of the seeds in addition to the bird beaks?** Probably cause it said stuff about how the little ones it took them like 15 minutes to get the big seeds open and stuff, so if you actually saw the seeds, it might be easier to tell.	* I didn't ask this.	Um, I didn't really understand what the globe was for. * **Were you able to find the beginning of his voyage? How was it confusing?** I can tell he starts here because it goes like that (points to the arrows), but it was confusing because it didn't like…I didn't completely read this (the text next to globe), but when I did, it didn't say "Now look on the globe and try to find…" You know, like anything, so I just looked at it, but didn't really understand it, because it didn't tell you (what to look for).		Just with the globe, with the explaining, that's probably…and maybe explaining that one a little better (the pages). I understood everything else.
11	M	Y	Differences in types of birds and why they are different	I would guess that they go to different islands and investigated the differences between the birds. It's cool. … investigates the differences in the general idea of Darwinian evolution	Because it's such a small difference in the beaks, but it's consistently different. Such a small adaptation can add up to a lot of differences over a long time.	Lined up the lines, measured its beak, and compared it. Clear that there was a difference.		Showed the difference in the physical traits in two species of birds.	DK. It's easy to understand.		

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19	M	A	** I asked him which exhibit he might like to talk about (for this final one). He said this one was his favorite (the human/chimp DNA). He said it was a "good visual." I would say that the human genome is something every human and mammal has…Do other species have genomes? I don't know, but I assume they do. This is the core of our structure as humans. This shows how similar our basic structure is to chimpanzees.	I'm assuming he looks at the human genome, DNA, under microscopes, uses computers to look at the nucleotides and then counts and charts them. And then he does the same for chimps. I don't know if he set out to prove that humans are similar to chimps, but that's what he found.	I didn't necessarily get this from the exhibit: The human genome is important to know because it identifies us specifically as human beings. In the future, if there is something wrong, scientists may be able to correct it. To go in and change it to cure illnesses or medical problems.	Counted the Paabos…to get an idea, feeling of the similarity.	* I didn't ask this	* I didn't ask this (his answer is already in the child expln part)	I think this one is the easiest to get. (He thought for a while and then I told him he didn't <u>have to</u>come up with something).		No changes.
2	F	A	"Oh wow. I'd say that DNA bits is what we are made of...actually any animal is made of. Look how similar we are: humans and chimps. Look at this (she points to the DNA match ups) same, same, same...	No idea. Didn't read it.	"There are few differences, and great similarities. There are so many likes food, habits...It really makes you wonder about humans and chimps, how different are we?"	"Looked at the letters. Found the little people."	"	"The differences in DNA. So very little differences between human and chimp."	Don't know.	(Viewer did not notice these.)	
10	F	A	I think kids would find this fascinating. You could just talk about how DNA is how we inherit different characteristics, it determines the color of your eyes. They wouldn't understand what the letters mean, but they would say wow, chimpanzees are not very different from us. And then over here, you would say that's why, they're saying humans are descended from chimpanzees and there basing that on a comparison of DNA. I think this would be fairly easy. The visual is meaningful.			I didn't even read Paabo till I started looking for the differences and started noticing there aren't many.		[mirror] This didn't interest me so much, but I think kids would have a riot. Their feet. They would be very interested in how their feet look so much more like hands, and you could talk about how they use them more like hands. Kids would have fun.	I don't know. I don't think this one is very hard to understand. I suppose just the scientific behind it – know the number of DNA sequences. But just comparing humans to chimpanzees, that's not hard to understand.		Don't know. The one thing I wonder is should there be something that talks about the controversy between the different science areas. There's still a lot of things out there that are theories and some are gaining more evidence than others. Would create interesting dialogue for students.
4	M	Y	Shows how close humans and chimps are by their DNA	Studies tiny changes or differences in DNA	The changes	DNA wall: looked for the little human guy to see where human and chimp were different	Fine	Differences in human and chimp DNA	Might not see the differences unless they look, but probably will look; pretty easy		Suggest that people look for differences across the wall instead of random looking for the human guy. That gets point across better
11	M	Y	Like the similarity between chimps and humans. How Darwin showed how we are related	I don't have any idea. Differences between the DNA of chimps and humans. Shows how the differences are due to mutation	Because you see that there aren't a lot of differences in coding. And how each difference can code for a different trait	I never really realized how few differences there were between the nucleotides of humans and chimps. We studied it in biology. But this makes it clear. [chemistry, 2nd year of High School]	I thought it was pretty good. It was self-explanatory. I can see how a kid could find it fun. [even though I am not a kid]		It's hard because there is a lot of information. Without a good background it would be difficult to understand the concepts and ideas.	He noticed that it was repeated in each activity and it helped a lot. The actual symbols did not help, just the vist concepts and titles	
25	M	A	(standing in front of DNA wall) Hard to explain, there are just little differences between chimps and humans, subtle differences. We are closely related.	Study these differences, find them.	Close relationship	<u>At the wall</u> - tracked the little guy. <u>Mirror</u> - there was nothing for me here, not interested, but would probably be interesting for kids. <u>Visit panel</u> - shows how closely related we are to chimps - relates to the DNA wall.	See above	See above	Don't know how you would explain this (wall) to a child.		Highlight the little guy so he can be seen more easily.
12	F	Y	**Next Unit:** Human (mirror) It explains how the handprints of the chimpanzees are and the monkeys.	* I didn't ask this.	How the animals are very…umm, what I'd like to know about these is how they eat bananas and coconuts…how they like 'em and why they like 'em.	I was looking at the handprints.	I think I was supposed to, umm, learn what they eat and what they do and their footprints and what they like to do.	* I didn't ask this.	Why they are so wild.		Um-um (shakes head no).
24	M	A	In looking at VIST panel friend said he wanted to know more about bonobos. 24 agreed. "Maybe just a little… most people haven't heard of them before, even though they are suppose to be very similar just a little separate aside explaining more about them. There is this parenthetical sentence." (Read that and wanted more information on the bonobos.)There is so much about DNA in our society and how it is used. But this is about evolution. **How would you explain what this exhibit is about to a child?** Everything is made up of little tiny building blocks. Whether it's humans, or chimpanzees, or whales, and these tiny building blocks, they can see that there is a very close connection between humans and chimpanzees. And I think if the kids have any, like my son,, we just went to a family reunion. Say he understands about ancestors, so I would show them the chart that millions of years ago that there was someone or something that eventually evolved into different branches or species and one of those was humans and one was chimpanzees. Comparison it to there past exp	I saw the names, but I didn't get much more about it. I was curious what country he was from because of the name. I would have been interested in seeing more about the scientists. Name and picture was prominent enough. **Left side of T:** Very straight forward, visual and informational. It was effective.	**What about the mirror? Asked about chimp away from mirror or on mirror.** This seems to be more geared for kids. Comparing the height. That might be more effective, you are seeing both in the reflection. The chimp is a little cheesy or less refined. It would take it one step further if you had 3 D chimps out here. It would be more accurate.	**What was the most surprising thing you learned at this exhibit?** The opposable thumb or toe. It wasn't as obvious to me before until I saw that (bottom left on mirror wall) Made me start thinking about evolving with that and climbing of trees and the function of it is different then what we use our feet for. So I thought that would be a great comparison for kids to make too. Why do they have an opposable toe?	**Asked about lower panel on VIST?** I had to make myself read it. The VIST part doesn't pop out. Once I read it in detail on the left I realized they were trying to make these four ideas come out. But it didn't pop out if that's what they were intending it to. Drawn first to upper panel. Then read lower.				
6 MA, 6aFY			Please explain this exhibit to your child? (Flip cards, DNA) 6-YEAR-OLD intently examines the flip-up cards They all (human/chimps) have the same things inside, like bones and blood ADULT: Shows the similarities between the human and chimp DNA. It's common knowledge but I did not realize how similar they really are ADULT: I knew about the Chimp Koko and the studies they did. She was almost human-like. She could reason and think like a human. This reminds me of that. They use tools like a human. DNA Exhibit. It took a while to figure out but I got it. I just didn't realize how similar they are.			(mirror manipulative) ADULT. She compared her feet and hands to the chimp. She really liked it. I pointed out that they had thumbs on their hands. In the zoo, we see the animals but we didn't know that they had thumbs. We really liked the mirror. It was amazing to look at the images in the mirror and see how much we are alike.	**How did this work for you?** ADULT It's really described well and laid out so clearly. It's easy to understand. Puts out a lot of information. I go to history centers mostly but I am trying to do whatever she is interested in. She was really interested in the flies, so we came in here. He's an engineer He thought the exhibit was really good for the 6-year old.				

ID#	Sex	Age group	How would you explain what this exhibit is about?	What does this scientist do for his research?	What makes this living thing special or interesting to scientists?	What did you do here?	How did this work?	What is this about?	What parts of this might be difficult for other visitors to understand?	7.5 VIST: Did you notice these symbols? Did they help you understand the ideas better?	Are there any changes you would recommend to improve this part?
9	F	Y	How we're related to monkeys and chimpanzees and to show that evolution did happen, even though some people think it didn't.	Uh, studied DNA and…discover…Can I just read it off there? Because I didn't look at this part (I said "That's fine. You can tell me that you didn't look at it.") Ok, I didn't get that all.	To see how closely related we are cause like, we're…I don't know how to explain it, um, just like we're like related to monkeys, but some people think that we aren't, and so they're trying to prove it.	Like read most of it and just looked at all the pictures and the graphs…like that thing (she is referring to the phylogeny on the back pane of the human/chimp VIST exhibit). I didn't read all of it, but I read most of it.	* About the mirror: Like I went and looked at the hands (she is holding up her hand as she is talking) to see which one was closest and found out that I'm more the child one because the adult female was like huge and my mom even put her hand up to that one and it was really, really big, so just looked at how cute the baby was and just looked at the feet. *Can you think of any way to improve this part? Shakes head no.	* We move over to talk about the DNA/Paabo part* **What did you do when you were at this part?** I read this sign and then I looked to see how many of these little guys I could find where they were different between us and chimps…and I only found like 9 of 'em, and they said there were ten.	It's really just um, the one over there (the VIST one), like it was really umm, like it was easy to figure out the little graph (the phylogeny), but then like when you like threw in all the names in, like the actual names of them (the scientific names) it got kinda confusing. And then like the dates, like the 12-15 million years and all that…Like if you had like a timeline, it might help.	Yeah. (nodded yes)	I don't think so.
7MA, 7aMY			Male Adult (Father) and 8-year-old son: Dad Explains DNA exhibit to kid: "Do you know what these letters stand for? These are part of the DNA. The scientists have been trying to figure out the DNA of the chimp and the human." KID: DNA is what makes you "you" It means that we are all the same as monkeys, and chimps, and those kinds of animals. Monkeys and people have the same DNA so we have a the same ancestors. We're a lot like the chimps, but we're most alike in the body parts.	**MIRROR manipulative:** Child compared hands, feet, and body and found he was the size of the female chimp. ADULT. This was something I knew a little about but I didn't know a lot . On the surface you don't seem similar to the chimp but the deeper you go the more similar you are. They really liked the mirror exhibit. It seemed very clear.						They read the VIST framework at the entrance and it really helped them understand the exhibit. All the symbols seemed fine except for the selection one. That wasn't clear.	On the human tree, he would have liked to see a picture of the common ancestors on the tree (like the whale one) and seen what they looked like. That would have made it much clearer how similar the two situations were, the whale and the chimp
24a	M	A	The thing that made sense to me was how closely connected we are to other living things. We should maybe, have a more respectful attitude toward other life forms besides humans. Not just plowing through. and about environmental things. Caring about the environment and other living things in the environment as well as humans because they are related.	I didn't see a whole lot about the scientists I would be interested in learning more about him and how they do the testing of DNA. I don't how you would show that. What are they the nucleotides. A lot of letters up there but what do they mean. I have to say I have been reading some novels that do a better job of explaining it then this panel. (referring to right side of the T panel). How do they combine, how does this combine and why does it matter in terms of DNA.		**Left side of T:** Kind of a hands on thing the kids would go for. **What about the mirror?** I have to admit there was something inside me that wanted to get down and act like a chimp. I like the pictures of the chimps and seeing the difference between the male and female and the baby. There are a lot of differences.					

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1	M	Y	How one ancient whale kinda turns into a wolf and a hippo.	He looks at bones from ancient animals and compares them to present day animals and makes links between the two.	Finding the ancestor of animals.	Looked at the bones, looked at the two different drawings (of the bones). The ankles looked exactly the same except the hippo's bigger.	I didn't ask this.	I didn't ask this (since question 1 already answers this).	What the different models are. (He thought at first that the large one in the middle was the wolf until he read the text).		Emphasize what these are and add more information – it's plain in the background and it looks a little boring.
2	F	A	We talked about (with her kids) the difference in the shapes and the differences in time.	Didn't notice	The differences. How things change or remain the same.	(She didn't do the hands-on. She looked at the cased skulls.) "We looked at each skull and looked at the ages."		"...the evolution of the transitional whale"	"why there is nothing in between. Where are those skulls? Is this all there is?"		Don't know.
25	M	A	Evolution of whale from land animal to a sea animal	Collects fossils, excavates somewhere, studies fossils	Study ourselves too. Evolution clearly related to ours	Ankle bone models - confusing	Ankle bone models - confusing - what is connection between single pulley and double pulley and what does it mean - my 12 yr old son would be confused. The evolution chart about whales is good – clear. The skull case - transition is understandable - fine	Don't really know - an ancient whale walked like a hippopotamus walks now.	Single/double pulley. Others - fine		Something different for the ankle bones -explain why they are significant
12	F	Y	I would probably tell them that this is like, how this is umm, umm, umm, I would probably say that how the whales were down in history.	He helped do things for the people who wanted to learn about ummm, I don't know what this word is (name of the fossil).	How they found the skeletons.	(skulls) I was looking and reading.	I didn't ask this.	I didn't ask this.	Umm, how they got the fossils and how they found them.		Um-um (shakes head no).
6	M	A	(Foot Joints) ADULT Reads the words to the child: "This is the same kind of exhibit. It shows a similarity between the hippo, wolf and whale. Shows how this ancient whale evolve and presents the evolution of the whale to the present. Shows that the whale is related to the hippo. They are both even-toed animals." [[me-what about the relationship to the wolf?] it is pretty much the same]			(Asked: What did you get from the exhibit?) : That whales could have been land based animals like hippos. He was not really surprised because he thought that he had heard this before. This exhibit made him remember it.		(At whale skulls) To ADULT: Does the term transitional mean anything to you? "Well, it means between one stage and another. It wasn't clear to me that the one in the middle was a transitional whale. Maybe they should mark it more clearly." In the panels, he pointed out the legs to his daughter and read the panels to the child.			
6a	F	Y				(Asked: What did you get from the exhibit?) : 6-year old: I look for fossils all the time and I like to look at fossils.		(At whale skulls) : The 6-year old doesn't see that this is a whale. Doesn't think that they look like whales.			
7	M	A	DAD: It is probably the same as the chimps. These whales look different on the outside but they are similar on the inside with parts on the inside that are much the same. Some whales are better at adapting than others, and they are the ones that survive.			(The transitional whale) : Read the information on the side and asked his son to describe what is going on. Talked about the hair and said that "hairy fish are scary." R... is a pretty old whale, look what he's got on this legs.	(Whale joints) : DAD: This exhibit links whales to the past see the single pulley and see the double pulley. How is this whale like the hippo? (Son "double pulley") This is connected to the transitional whale. Which one is more whale-like? What is the relation between the whale and the wolf? What does that tell you about the similarity?	(The transitional whale) : A transitional whale is in between the very old whale and the modern whale. He has some of the features of the old whales and some of the features of the new whales.			Really liked the exhibit. It was about evolution, which seems really simple, but this demonstrates that nuts and bolts of evolution. I think it does a great job. It shows clearly variation, what changes, and what stays constant.
7a	M	Y					(Whale joints) : 8-year-old boy: It tells me that it is like the hippo and really more like the hippo than like the wolf.	(The transitional whale) : SON: he didn't know the term transition but was able to point out which whale was in the middle of the other whales and clearly had the idea of the shared features.			

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28	F	A	(Second) FA: I think it's how the land animals became…(Fourth) FA: That's ok, but I can see how you might think that, but I think that it's the other way, how the whale went from that one picture where he's got the feet to the nowaday killer whale type and how that the, I liked how they were showing the ankle bone, that they're kinda the same in the animals today.	(First) FA: What does he do? Well, he's looking at the type of the fossil stuff, what's in Pakistan and showing the bones, how they are linked to the animals today…which we know that they are probably millions of years old, the old ones. (Third) FA: Good answer. Hey, you guys, he is from the University of Michigan.	(First) FA: How it went from the land to the sea. I think that's what makes it interesting for me. I would think that's why they want to look at it.			(Asked: So can you guys tell me a little more about the bones? What did you think when you compared them? So what similarities or differences did you see between the bones?) (Fifth) FA: The way they rotate and stuff are the same.	FA: I liked this (points to VIST phylogeny graphic), how they did the…Putting the hippo, I really didn't understand why, I still don't. I think it has to do with the wolf, but maybe have them separate. You know, I can understand what they are trying to say with the bones and stuff, but I think that might be the one thing that might be a little difficult to understand.		FA: No. I think it's good the way it is.
28a	F	Y (14)	(First) F14: How the modern animals can link to, how they sorta became land animals. . . (Third) F14: I got it backwards.			(First) F14: I compared the bones.		(First) F14: That they had four (Third) or whatever they want to call them. And that most of their ankle bones are the same, except they're bigger.			
28b	F	Y (11)		(Second) F11: Showing evolution. (Fourth) F11: Michigan!	(Second) F11: Yeah.	(Second) F11: Yeah.		(Second) F11: toes. (Fourth) F11: ankle bones. (Sixth) F11: The smaller the animal, the smaller the ankle bone. That's bigger than that one.			
27	F	A	Start with VIST would be good. She started with ankle bone and it was very confusing. Didn't know why the wolf was there. It makes more sense once you have looked at the VIST. I don't understand how hippos and wolf connects to those images over on the VIST panel. They couldn't see the differences between the ankle bones even after I pointed them out. Perhaps don't highlight the whole bone just the parts that are different. They didn't focus on the red. They were looking at the whole foot not the ankle bone. Use an orange color and just dots and tie it to the drawing with the color. Different view of ankle bones, top view and side view. They were comparing the size too, not the bone.	Wanted a button to push that would have the scientist talking and you could learn more about this.	Because of evolution. That came a lot; very clear with VIST panel and skull panel.	(Asked What was most interesting point that you learned?) I didn't know that the first whale had four legs. I didn't get if this is a fact or is a theory. What are they basing this on? I see the ankle bone, and the skulls, but to me I don't really see it. They all look the same. Gray wolf ankle bone looks the same to the amateur as the other ankle bones.					
40	M	A	"Mainly about whales. Where they are found...primary in Pakistan and in India." They were thinking that they started in this area since they were found only in this area. It's about whales...how they were formed. How this turned into this...and to this. (Explanation gives to his daughter as she approached the exhibit.)	"He's like an archeologist...for bones...studying."	"Laugh. Only been found in one particular area. It shows the start of evolution of particular species of whales."	(read)		"They were saying whales had a foot like a seal…and might brought themselves on land." They were interested in shapes of feet. How they are like hippos.	The red bones made more sense after viewing the panel.	VIST: I can see how they los legs and how they turned into a fin type thing. Maybe they didn't need them at the time…and their hands turned into feet.	"They have good visual things on the chart. It helps to break down the idea." (whale images on the chart)

ID#	Sex	Age group	What was the point of the whole exhibit?	What questions do you have about the exhibit?	What would you alter or add to make the exhibit more interesting to you?	How else would you change this exhibit?	Did you notice anything about the size of the organisms?	Extra questions.
4	M	Y	Showing changes through evolution over time and how it changes and why	Not any that come to mind	More contrast with the color in exhibit - too much same color \just a tan color use color to show different parts. (beginning interactives but ending died away, spread out more)	Use more people words, rather than scientific words; it's a science museum, but I don't think half of the people that come here would understand ¾ of those words. The only reason I know a bunch of them is because I spent half a year last year in a science class; otherwise, I'd be lost. Life science class, cells, diatoms, looking through microscopes, what are plant-like animals…..Also, on the whale exhibit, it was too drastic between walking animal to the swimming whale; needed an intermediate animal. Can't see similarities -	Yes, virus, cells, ants and birds…Didn't make a whole lot of difference but interactive stuff sort of died away after beginning.	
5	F	A	Evolution and change and research	No questions popped into my head	Change the order of things; toughest exhibit to understand, at least for me. I didn't get the feel for those first two coming in or the theme. Put the one with where did humans come from, right away people know you're talking about evolution and then they would follow better. People won't think evolution right away with HIV or diatoms. Be clearer in their mind when they come to the HIV or diatom that it is about evolution, the theme and the way exhibits moving.	See above	Ended up with whale and then realized you began with virus. But no effect no overall opinion about evolution theme.	
3	F	A	That evolution occurs in tiny organisms and large mammals.	I'm still caught up in what is a virus. Wanted to know what are the roots of evolution. Is it luck, circumstance. We say things change and evolve, but I'm still not sure why. It's different conditions and having to adapt, but I'm still not sure.	Take much more personal approach. "History's mysteries" How do we understand how things change over time? Here are scientists studying change. Something that's relevant to you in terms of change and then pull back and explain it in terms of diatoms. I'd constantly be asking questions of visitors. I'm struck by the fact that everybody knows everything already in the show. There's not any mystery, any questions still to be asked. It's about telling me about everything you know, instead of engaging me in the wonders of our world.	Simple, elegant interactives. Even simpler interactives. Really driving home that me as a visitor can add to what's understood, even if it's an artificial construct. Engage visitors in scientific process. Ask visitors to observe, classify.		
16	M	Y	The nature and dangers of viruses and things.	None	He didn't respond so I asked if he thought it was interesting or had he found he was ready to go somewhere else? "Bored for a while then the finches engaged me." Mother asked him if he would like more interactives? He said "yes, more things to do." "I liked the rotating flies."	Don't know.	No.	
23	F	A	"Evolution and showing how things began and progressed through thousands of years."	"I don't have any questions."	"More hands on and less reading of long text."	"It is set up nicely."	No. (They only got through the fungus and they were running out of time so we had to do the questions.)	
19	M	A	To explain DNA and cell structure and biological inter-relations, evolution.	How do scientists actually look at the DNA model? How do they know how many nucleotides? What is the process of actually…If you were to take a piece of hair and map it DNA-wise, how would you do that?	That goes back to what I just said, make that part a little bit more clear…Maybe take a police thing almost, like if you had a piece of hair or something, how would they identify it as a certain DNA strain?	Like I said before, the intention. What is the intention, just right off the bat, say "This is exhibit is about this and you gain this knowledge by the time you walk out of here.	Very small, everything was stripped down to a very small…(Child says "And then enlarged")	
1	M	Y	Different researching of scientists.	I don't really have any questions. **I asked, "Anything about what you saw…Or any questions about what you didn't see?"** I didn't really understand the chimp and the human **I asked, "Was there anything specific you wanted to know about it?"** Like what it was about because I didn't see much of anything to really look at, and I didn't have much interest in it cause it looked kinda boring.	Add more information to it, make the information emphasized, make it different fonts, something just to change it and make it more exciting.	**I asked "Is there anything else you would do to change the exhibits?"** No.	Size? Like how big they were? Yeah, the cell one, like on the water fungus, I think it is, yeah. That was pretty big, that was cool, that grabbed my eye, that was good. **I asked "The model?"** and he nodded yes.	
22	M	Y	"Shows how evolution takes place. Sometimes it is slow and sometimes it is fast." (dad comment)	No ideas here…	Move virus away from the entry. Start out with ants or pond scum. Virus model is a good object for drawing people in, but virus is too hard an idea to start with. Make it later in the exhibit. (this was mentioned twice.)	"The hands on was pretty good in the beak exhibit. Measuring wheel was not worth much. The description (In Finch) needs to change to be cleared. "Flip book thing wasn't clear.		
2	F	A	"The point is to show how different animals including humans have evolved...not evolved, but changed over time." How things are alike and similar	I don't know how they picked the topic they did but I guess they picked what they had the most information about. But it is a curious mix of things that seem almost random." (She had not noticed the idea of new scientific research.)	"I thought it was pretty interesting. Maybe the flow could be different. I liked the big atom...that was cool." (she meant the HIV model)	No response. She did say she liked the spaciousness of the exhibits. " if there is too much stuff then you get distracted and lose focus."	No I didn't.	

ID#	Sex	Age group	What was the point of the whole exhibit?	What questions do you have about the exhibit?	What would you alter or add to make the exhibit more interesting to you?	How else would you change this exhibit?	Did you notice anything about the size of the organisms?	Extra questions.
13	F	Y	It was about evolution and the way different animals and bugs do their things and how they look.	It didn't tell me much about evolution. I'd like to learn more about that.	More on the monkey stuff.	More colorful.	They're small.	
10	F	A	To show how species evolve. How various things, changes in environment, in preference, reproduction in virus, how things can effect a species and create a change in a species. Is it evolution in a species or adaptation?	What are the controversies? Age old controversy of adaptation versus evolution. I had some specific questions for the vocabulary, looking for definitions of some words.	Interesting to have an actual strand of DNA, like the virus, that could be manipulated, hands on. To give kids an idea of DNA looks like, to understand that DNA affects the color of eyes. To appeal to kids, the more hands on the better.	Depends on target audience. To appeal to younger kids, simplify; the more you put it in kid language – if you were a fly scientist, why would you want to study flies. Ask a question and explain in simple terms why you study flies. Right now, most of this is written for adults to read.	No. Chimps set at life size; virus molecule being larger is a good thing. Displays themselves seemed small, amount of space, couldn't really have a lot of individuals around one.	
21	F	Y	To describe the different evolution of different animals	It was pretty understandable	To make the finch exhibit more detailed to explain how they evolved so rapidly and so differently. From her biology class she thought that evolution took a very long time. Whales don't evolve very rapidly but the finches do.	Liked it and thought it was clear	Noticed in Hawaii that the flies were a lot bigger than in other parts of the world	
11	M	Y	Genetic evolution and how changes could have affected the animals. How the world always changes	Wished there was more on the virus and the way that each of them connected to each other. I want to know how viruses work.	Liked the part on human evolution because people could relate to it. Maybe use something like dogs in one of the exhibits so that people could see how they can affect evolution.	Make it bigger. I know it's very interesting and it helps. It's like a college course, learn new stuff	Size? Visual representation? I know that the virus and diatom are small but they look big out there. That's good because kids can see it and they can relate to them	**Did the exhibit make you think about becoming a scientist?** I'd like to do the science, but I like people and I don't think I would want to be stuck in a lab for about 12 hours a day **What about social science** yes that might be interesting (more on the tape)
15	F	A	"I know its about evolution. It talks about how things got thier start. Although we belive in creation ourselves. My family believes in creation.... We believe that humans were not the first life forms on the planet. We believe that there were many other life forms before us. ..And our life form characteristics from other life forms the characteristics took That's one theme." And then it talks about how parts of nature are interdependent on each other. That four part study by Cameron Currie...And how humans didn't need to be involved...that they propagate by themselves...and they had that all figured out on their own."	"Not necessarily. I probably would have if I would have spent more time."	I like visuals. I liked the auditory. I like to read and listen simutaneously. (More sound) I liked having humans and chimps hands compared." She liked having sizes compared.	(interviewer asked "did you find that comparision of humans and chimps offensive?" No we go to the zoo …and I tell my kids look at how their bodies are similar to our bodies...look at how they use their hands. So I don't think that is offensive."	No.	
25	M	A	Evolution of all species, span the gamut of finches, chimpanzees, whales, trying to debunk creationist theories. This is how we evolved.	In a couple of them, why go so deep into the scientists rather than the research, the Hawaiian researcher, rather than the bugs, which I suppose could be fine if that's what they are shooting for.	Only a couple real interactive things in there, like the microscope, but I couldn't say specifically what, there's a lot of reading there, I could see my 12 yr old son seeing this and saying I don't want to do this because I have to read all this. of all the reading. Less to read, more to do	The text is important, if they're a reader, they'll love it, if they're not, then they're just lost again. Nice if you had it set up both ways.	**(did you notice that the organisms were different sizes?)** Spans the gamut - virus, flies……finches… gets larger HIV started it off.	**Favorite or best:** Liked the HIV model, confused me for a minute, but I did like it. The whale, the whale evolution, the evolution chart primarily, but liked all three were ok, but the one with the ankle bones was completely confusing - I ignored it and tied back into the charts. I did like the finches, too - always enjoyed natural selection. **Anything surprising?** Not to me **What did you get out of the exhibit: Take home message for a visitor:** Evolution period. You may have trouble with the religious right. People will argue that this is just fighting with creationism.
12	F	Y	Why and how people learn. **I asked, "Do you mean people, like the scientists?"** She said, "Um-hum" (nodded head yes).	Ummm, questions are…Why umm, the male and female flies have different pairs of wings.	Umm, I would…(I say, "Don't have any?") She shakes head no		Shakes head no.	**Did it make you want to be a scientist, more than before you came to the exhibit?** Nods head yes.