Summative Evaluation
Dynamic Earth

Prepared for the Newark Museum

Randi Korn & Associates, Inc. July 2003

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EXECUTIVE SUMMARY

This report presents the findings of a summative evaluation of *Dynamic Earth*, conducted by Randi Korn & Associates, Inc. (RK&A), for the Newark Museum in Newark, New Jersey. Data collection took place in April and May 2003. The evaluation documents the scope of the exhibition's impact and effectiveness via timing and tracking observations and exit interviews.

Only the most salient findings of the evaluation are included in this summary. Readers are urged to read the body of the report, which includes many details about the evaluation that the Newark Museum staff will find both interesting and insightful.

I. PRINCIPAL FINDINGS: TIMING AND TRACKING OBSERVATIONS

RK&A conducted 50 timing and tracking observations.

- One-half of observed visitors were female and one-half were male.
- About two-thirds of the observed visitors were 16 years of age and older.
- Nearly all the visitors were visiting the exhibition in groups of adults and children.
- Visitors spent a median of 25 minutes and a mean of 27 minutes in *Dynamic Earth*. Comparing this time data to a database of other similar exhibitions, visitors to *Dynamic Earth* moved more slowly through the exhibition than visitors to other similar exhibitions.
- Visitors, on average, stopped at 24 percent of possible exhibit components. In comparing these data to a database of other similar exhibitions, visitors used *Dynamic Earth* less thoroughly than did visitors to other similar exhibitions.
- Of all observed behaviors, nearly all visitors used one or more activities/magnifiers/touchable specimens, engaged in social interactions, and read one or more panels (96 percent, 94 percent, and 92 percent, respectively). Less than one-half of visitors looked at graphics or interacted with staff (42 percent and 30 percent, respectively).
- When behaviors were examined among demographic characteristics, three statistically significant relationships emerged. Males watched more videos than did females. Adults read more panels than did children. Children used more multimedia than did adults.
- Visitors spent the most time in the Highlands of New Jersey section (median time of about 4 minutes) and the least time the Amber Temporary Exhibition (median time of about 1 minute).
- Visitors stopped at the most exhibits in the Highlands of New Jersey and Forces of Change (each median of 4 stops), and they made the fewest stops in the Resource Area (median of 1 stop).

- When comparing time spent at individual exhibit components, visitors spent the most time at the Survival of the Finchest multimedia (median time of 7 minutes, 11 seconds). Visitors also spent considerable time at the *Dynamic Earth* Introduction video (median time of 3 minutes, 50 seconds) and the Resource Area (median time of 3 minutes, 36 seconds).

- When comparing stops made at individual components, the greatest number of visitors stopped at the Rocks Aglow specimens/panels and the Highlands of New Jersey diorama/specimens/panels/video (74 percent and 72 percent, respectively). No visitors stopped at the Folded Rock specimen/panel, Life Adapts to Change Introduction panel, Making It Through the Season panel, Winter Green panel, Highlands Cave Introduction panel, or A Hole In the Roof panel.

- Visitors had the most exhibit-related social interactions at the Parabolic activity (27 visitors). Social interactions were frequent at the Grassland Biome, Highlands of New Jersey diorama, and Survival of the Finchest (23 visitors, 22 visitors, and 21 visitors, respectively).

II. PRINCIPAL FINDINGS: INTERVIEWS

RK&A conducted interviews with 31 visitors, including 20 adults and 11 children.

Visitation Patterns

All but one child were first time visitors to *Dynamic Earth*. About one-third of interviewees came to the exhibition on the recommendation of a friend or family member.

Overall Visitor Opinions

All visitors said they enjoyed the exhibition. When asked specifically what they enjoyed most, interviewees named a variety of exhibit components. About one-third of all interviewees were most interested in seeing real objects and artifacts. Over one-half of children said they enjoyed learning about animals and their habitats. One-third of adults and children enjoyed the simulated cave environment. One-third of adults said the orientation film was their favorite aspect of the exhibition because it provided an introduction. One-third of children said they liked the amber exhibit best.

Over one-half of interviewees said there was nothing they did not like about the exhibition.

Conveying the Content

When interviewees were asked to name one new idea or bit of information they took from the exhibition, their responses varied. One-third of children said they learned something new about animals' habitats. One-quarter of all interviewees said they learned how the Earth was formed. One-quarter of adults said they learned that insects become trapped in amber. One-quarter of adults said they learned something new about caves in New Jersey. About one-quarter of interviewees said they learned nothing new.

Three-quarters of interviewees said the main idea of the exhibition was the changing Earth, citing biologic and/or geologic change. Their responses ranged along a continuum, including: general change on Earth over time; the formation and/or evolution of Earth through plate tectonics; and animals adapt in response to geologic changes on Earth. One-quarter of interviewees described the main idea as animals and their habitats or nature in general.

Amber Gallery

Over three-quarters of interviewees visited the amber gallery. Most said the main idea was to show how insects become trapped in amber. Many interviewees could not explain the connection between the amber gallery and the rest of the exhibition.

Staff Interaction

Over one-half of interviewees said they had no interaction with staff. Of those who interacted with staff, adults asked staff for directions and children were told something about the exhibition's content.

Comparison to Other Museums

Most adults had been to similar exhibitions, citing the American Museum of Natural History and the Liberty Science Center. Most children could not recall a similar exhibition. When asked to compare *Dynamic Earth* to other similar exhibitions, most adults said *Dynamic Earth* is more manageable in size and content.

DISCUSSION

Findings from the summative evaluation of *Dynamic Earth* indicate that the exhibition was highly successful. Two findings in particular point to the exhibition's effectiveness. First, when compared to a database of other exhibitions of similar type and size, visitors spent much more time in *Dynamic Earth.* Second, most adults and children understood all or part of the exhibition's main idea—that the Earth is always changing geologically, which affects changes biologically (adaptation). It is highly unusual for visitors' collective experiences to be so focused on one idea. An examination of the exhibition reveals several factors that appear to have contributed to these exceptional findings.

The orientation film (and its accompanying sound and light presentation) was critical to setting the stage for the exhibition and contributing to visitors' understanding of the main idea. Observations showed that over one-half of visitors stopped at the orientation film, spending an average time of 3 minutes, 50 seconds. In interviews, many adult visitors and some children mentioned the film, commending it for providing context for the exhibition. Research shows that presenting organizing concepts in an introduction to an exhibition leads to better retention among visitors (Ausubel, 1960). Concepts presented in an introduction serve as anchoring points for the visitors' integration of new information. Moreover, in other studies conducted by Randi Korn & Associates, orientation films have proven effective in conveying exhibition's main messages (RK&A, 2001).

Too often exhibitions are designed in a fragmented way, with only one opportunity for visitors to grasp the main idea, but *Dynamic Earth* was designed so that its main idea was repeated and consistent. In interviews, visitors said they came to understand the main idea through the orientation film, the dioramas (and specimens within them), and the multimedia. The consistent voicing of the exhibit's main message by adults and children interviewees is notable since visitors tended to use and prefer different aspects of the exhibition. The varying patterns of use and preference suggest that each type of media was successful at conveying the exhibition's main message.

Dynamic Earth was comprised of many different types of exhibits—dioramas, video, multimedia, and text panels, to name a few. Findings show that this variety of exhibitry worked to the exhibition's advantage by providing something for everybody. Interview findings show that visitors' favorite exhibit components varied greatly and depended on personal preferences and interests. Furthermore, observation findings show that, except for stand-alone text panels, most of the exhibit components were stopped at by at least one-quarter of visitors, and each of the exhibition areas were visited by at least one-half of the visitors.

Museum visitors in general value the opportunity to see artifacts and authentic specimens, and the use of objects and artifacts in *Dynamic Earth* was highly effective at engaging its visitors and reinforcing the geological and biological changes. In interviews, many adults and children said they most enjoyed the fossils, rocks, specimens, and animals. The observations further supported visitors' interests in authentic objects — the exhibition components rich with objects and specimens, such as the dioramas and cave, were stopped at by many visitors. Moreover, two exhibit components—the Parabolic and the amber magnifiers, which both allowed visitors to

interact with the objects—were used by many visitors. Visitors tend to want to see—and if possible touch and interact with the "real thing." RK&A runs across this preference time and again, in all types of museums. The Newark Museum has done an excellent job of designing *Dynamic Earth* with exhibits and experiences that put primary emphasis on the objects—using collections as the point of reference from which to explore ideas, concepts, or theories.

Nevertheless, there are several areas in which there is room for improvements or re-examination. First, the amber gallery, though very popular, did not adequately convey its main message, which was the role scientists play in discovery and the process of scientific inquiry. Rather visitors tended to enjoy simply looking at the amber specimens and insects trapped within. In future temporary exhibitions in this space, the Museum should consider developing an interactive activity that takes visitors through the process of scientific inquiry and make more concrete connections to *Dynamic Earth*.

Stand alone text panels were stopped at by few, and in some cases, no visitors. Many of these stand alone text panels included process graphics, which then also received little attention. This phenomenon happens time and time again in all types of exhibitions. Visitors are more likely to read text or pay attention to graphics if they are associated with an object or experience. In future exhibitions, the Museum should try and avoid the use of stand-alone text and graphic panels.

Finally, staff may have been underutilized. The Museum expressed a strong interest in understanding visitors' experience with *Dynamic Earth* staff; however, it did not set parameters about the percentage of visitors it would like to have interactions with staff. According to observation data, between one and three staff persons were in the exhibitions two-thirds of the time, and staff interaction (including guards and explainers) occurred with thirty percent of visitors. Interview data shows that less than one-half of visitors had staff interactions (and many of those were to ask guards for directions). It is up to the Newark Museum to decide if these numbers of staff interaction are high enough. If they are not, the Museum should consider ways to increase staff interaction.

Overall, the Newark Museum deserves high praise for *Dynamic Earth* and should be commended for creating an enjoyable and educational visitor experience. It is not often that RK&A has the opportunity to evaluate such an effective exhibition.

References

Ausubel, D. 1960. "The Use of Advance Organizers in the Learning and Retention of Meaninful Verbal Material," *Journal of Educational Psychology*, 51(5): 267-272.

Randi Korn & Associates, Inc. 2001. *Summative Evaluation of the Newseum*. Unpublished manuscript.

INTRODUCTION

This report presents the findings of a summative evaluation of *Dynamic Earth*, conducted by Randi Korn & Associates, Inc. (RK&A), for the Newark Museum in Newark, New Jersey. Data collection took place in April and May 2003. The evaluation documents the scope of the exhibition's impact and effectiveness via timing and tracking observations and exit interviews. The evaluation's objectives were to determine:

- Which exhibits visitors use
- The amount of time visitors spend in the exhibition and using individual exhibits
- What specific behaviors visitors display as they use the exhibits
- What meaning visitors make from their experience
- Whether visitors understand that the exhibition shows that Earth is always changing—both geologically and biologically
- Whether visitors understand that the temporary gallery shows how scientists work
- How staff explainers and volunteers influence the visitor experience.

METHODOLOGY

Two data collection strategies were employed to assess visitors' experiences in *Dynamic Earth*: timing and tracking observations and exit interviews.

Timing and Tracking Observations

Visitors are often observed to provide an objective and quantitative account of how they behave and react to exhibition components. Observational data indicate how much time visitors spend in an exhibition and suggest the range of visitor behaviors.

All visitors nine years of age and older were eligible to be unobtrusively observed in the exhibition. Observed visitors were selected following a continuous random sampling method. In accordance with this method, the observer was stationed at the exhibition's entrance, and the first eligible visitor to enter was observed. The observer followed the selected visitor through the exhibition, recording the exhibits used, select behaviors, and total time spent in the exhibition (see Appendix A for the observation form). After that visitor completed his/her visit, the observer returned to the entrance to await the next eligible visitor entering the exhibition.

Exit Interviews

Open-ended interviews motivate interviewees to describe their experiences, express their opinions and feelings, and share with the interviewer the meaning they constructed from an experience. Open-ended interviews produce data rich in information because interviewees talk about their experiences from a personal perspective.

Upon exiting the exhibition, visitors nine years of age and older were eligible to be selected (following a continuous random sampling method, as described above) to answer several questions about their experiences (see Appendices B and C for interview guides). The interview

guide was intentionally open-ended to allow interviewees to discuss what they felt was meaningful. All interviews were tape-recorded with participants' permission and transcribed to facilitate analysis.

DATA ANALYSIS

The observational data were quantitative, and were entered into a computer program to be analyzed statistically using SPSS/PC+, a statistical package for personal computers. Frequency distributions were calculated for all categorical variables (e.g., gender, age group).

Summary statistics, including the mean (average), median (data point at which half the responses fall above and half fall below), and standard deviation (spread of scores: "±" in tables), were calculated for the time data.[1]

Visitors' responses to interview questions were analyzed qualitatively, meaning that the evaluator studied the responses for meaningful patterns. Similar responses were grouped together as patterns and trends emerged and these trends are illustrated with verbatim quotations.

METHOD OF REPORTING

The data in this report are both quantitative and qualitative. For the quantitative data, tables display the information in an easily accessible way. Percentages within tables may not always equal 100 due to rounding. The findings within each topic are presented in descending order, starting with the most frequently occurring.

Interviewees' verbatim quotations (edited for clarity) illustrate major trends in the data and convey visitors' thoughts and feelings as fully as possible. The interviewer's remarks appear in parentheses. The gender and age of each interviewee appear in brackets at the end of each quotation.

Findings in the report are presented in two major sections:

I. Timing and Tracking Observations
II. Interviews

[1] For the most part, medians rather than means are reported in this document because, as is typical, the number of components used and the time spent by visitors were distributed unevenly across the range. For example, whereas most visitors spent a relatively brief time with exhibition components, a few visitors spent an unusually long time. When a distribution of scores is extremely asymmetrical (i.e., "lopsided"), the *mean* is strongly affected by the extreme scores, and consequently, falls further away from the distribution's central area. In such cases, the *median* is the preferred measurement because it is not case sensitive to the values of scores above and below it—only to the number of such scores.

I. PRINCIPAL FINDINGS: TIMING AND TRACKING OBSERVATIONS

BACKGROUND INFORMATION

The observer timed and tracked visitors in May and June 2003, observing 50 drop-in visitors, ages nine years and older.

The majority of observations were conducted on weekend days when few visitors were present in the exhibition (see Table 1). About two-thirds of the observations were conducted when one or more staff persons were present in the exhibition (64 percent).

Table 1
Data Collection Conditions
(*n* = 50)

Condition	%
Day	
Weekend	60.0
Weekday	40.0
Level of Crowding	
Few visitors	70.0
Moderate	20.0
Crowding	10.0
Number of Staff	
0	36.0
1 to 2	30.0
3 or more	34.0

VISITOR DEMOGRAPHICS

As Table 2 shows, more than one-half of visitors were female and less than one-half were male (58 percent and 42 percent, respectively). About one-third of visitors were children (ages 15 years and younger) and two-thirds were adults (16 years of age and older) (34 percent and 66 percent, respectively).

Table 2
Visitor Demographic Characteristics
(*n* = 50)

Characteristic	%
Gender	
Female	58.0
Male	42.0
Age	
12 years and younger	24.0
13 to 15	10.0
16 to 18	2.0
19 to 24	0.0
25 to 34	4.0
35 to 44	38.0
45 to 54	10.0
55 to 64	10.0
65 years and older	2.0

Most visitors were visiting the exhibition in groups of both adults and children (82 percent) (see Table 3).

Table 3
Group Composition
(*n* = 50)

Characteristic	%
Visiting with Children	82.0
Visiting without Children	18.0

OVERALL VISITATION PATTERNS

Total Time Spent in the Exhibition

As Table 4 shows, visitors spent a median of 25 minutes in *Dynamic Earth*. The shortest time a visitor spent in the exhibition was about 4 minutes and the longest time was 53 minutes.

Table 4
Total Time Spent in *Dynamic Earth*
(*n* = 50)

Median	Minimum	Maximum	Mean	±
25 min., 23 sec.	4 min., 27 sec.	53 min.	26 min., 57 sec.	12 min., 57 sec.

To compare *Dynamic Earth* with other exhibitions of similar size, RK&A used Serrell's "Sweep Rate Index" (SRI).[2] The SRI is calculated by dividing the exhibition's square footage[3] by the average total time spent in the exhibition.[4] The lower the SRI, the more time visitors spent per square foot of space. The SRI for *Dynamic Earth* is 185.5 square feet per minute.

The SRI for *Dynamic Earth* is much lower than Serrell's average SRI for large diorama exhibitions and large nondiorama exhibitions (see Figure 1).[5] This means that visitors in *Dynamic Earth* are moving much slower through the exhibition than visitors in exhibitions of similar size.

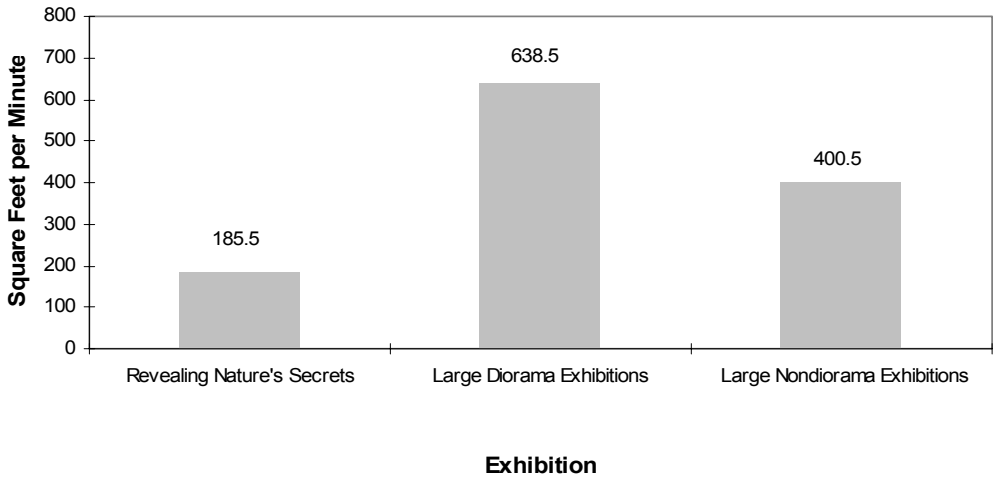
[2]Serrell, B. (1998). Paying attention: visitors and museum exhibitions. Washington, D.C., American Association of Museums.

[3]*Dynamic Earth* is 5, 000 square feet (4,500 square feet for the main exhibition and 500 square feet for the temporary exhibition space).

[4]The average total times were used in the SRI calculation in accordance with Serrell's methods. Throughout the rest of the report, the median times are reported, as the median is standard for time data unevenly distributed across its range.

[5]Serrell reports an average SRI of 638.5 (±236.7) for large (>3,900 square feet) diorama exhibitions and an average SRI of 400.5 (± 191.5) for large (>3,900 square feet) nondiorama exhibitions.

Figure 1.
Sweep Rate Index



Number of Exhibits Stopped At

Dynamic Earth included 66 exhibits at which visitors could stop.[6] **For this evaluation, a "stop" was defined as a visitor standing for three seconds or longer in front of a component. If a visitor returned to a component at which he/she had previously stopped, this return was not counted as an additional stop, but the amount of time spent was included in the total time spent at the component.**

As Table 5 presents, visitors stopped at between 1 and 35 exhibits in *Dynamic Earth*. Visitors stopped at a median of 16 exhibits.

Table 5
Total Number of Exhibits Stopped at in *Dynamic Earth*
(*n* = 50)

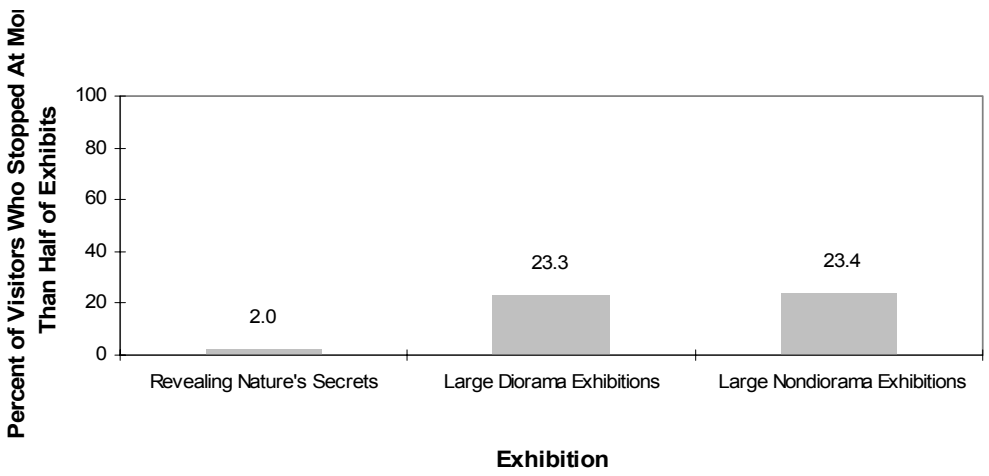
Median	Minimum	Maximum	Mean	±
16.0	1.0	35.0	17.2	7.4

Comparing *Dynamic Earth* with exhibitions of similar size, RK&A used Serrell's "Percentage Diligent Visitor Index" (%DV).[7] The %DV is obtained by calculating the percentage of visitors who stopped at more than one-half of the exhibits. The higher the %DV, the more thoroughly the exhibition was used. The %DV for *Dynamic Earth* is 2 percent. That is, one visitor stopped at more than one-half of the exhibits in the exhibition.

The %DV for *Dynamic Earth* is lower than Serrell's average %DV for large diorama exhibitions and nondiorama exhibitions (see Figure 2).[8] This means that visitors stopped at fewer exhibits in *Dynamic Earth* (i.e., used it less thoroughly) than did visitors in exhibitions of similar size.

[6]See Tables 13 and 14 for a complete list of the exhibits eligible for a "stop."
[7]Serrell, B. (1998). Paying attention: visitors and museum exhibitions. Washington, D.C., American Association of Museums.
[8]Serrell reports an average %DV of 23.3 percent (±19.8) for large (>3,900 square feet) diorama exhibitions and an average %DV of 23.4 percent (±20.4) for large (>3,900 square feet) nondiorama exhibitions.

Figure 2.
Percentage Diligent Visitor Index



Summary of Behaviors

The observer recorded a series of behaviors: looking at dioramas, reading panels, watching videos, using multimedia, using activities/magnifiers/touchable specimens, having social interactions, and interacting with staff.

As shown in Table 6, visitors were actively engaged while in the exhibition. Nearly all visitors used one or more activities/magnifiers/touchable specimens, engaged in social interactions, and read one or more panels (96 percent, 94 percent, 92 percent, respectively). Most also looked at one or more dioramas and watched one or more videos (each 90 percent). Less than one-half of visitors looked at graphics or interacted with staff (42 percent and 30 percent, respectively).

Table 6
Prevalence of Each Behavior
(*n* = 50)

Behavior	%
Use activities/magnifiers/touchable specimens	96.0
Social interactions	94.0
Read panels	92.0
Looking at dioramas	90.0
Watch videos	90.0
Use multimedia	74.0
Look at graphics	42.0
Staff interactions	30.0

Visitors engaged in social interactions at a median of 8 components (see Table 7). Visitors used a median of five activities/magnifiers/touchable specimens and five reading panels. Visitors used the fewest graphics (median of 1 graphic).

Table 7
Total Number of Behaviors Exhibited in *Dynamic Earth*

Behavior	*n*	Median	Minimum	Maximum	Mean	±
Social interactions	47	8.0	1.0	19.0	8.1	4.5
Use activities, etc.	48	5.0	1.0	12.0	5.1	2.8
Read panels	46	5.0	1.0	18.0	5.8	4.3
Watch videos	45	2.0	1.0	5.0	5.1	2.8
Looking at dioramas	45	2.0	1.0	4.0	2.2	1.0
Use multimedia	37	2.0	1.0	4.0	1.7	0.8
Staff interactions	15	2.0	1.0	7.0	2.4	2.0
Look at graphics	21	1.0	1.0	3.0	1.4	0.7

When behaviors were examined among demographic characteristics, three statistically significant relationships emerged (see Table 8). Males watched more videos than did females. Adults read more panels than did children. Children used more multimedia than did adults.

Table 8
Differences in Behaviors Among Demographic Characteristics
(*n* = 50)

Gender[1]	*N*	Mean Number of Videos Watched	±
Male	21	2.7	1.3
Female	29	1.7	1.3
Age[2]	***n***	**Mean Number of Panels Read**	**±**
Adult	33	6.3	4.8
Child	17	3.5	2.8
Age[2]	***n***	**Mean Number of Multimedia Used**	**±**
Child	17	1.7	0.9
Adult	33	1.1	1.0

[1] $p = 0.01$ [2] $p = 0.03$

VISITATION TO EACH EXHIBITION SECTION

Dynamic Earth included seven main sections: Introduction Area, Forces of Change, Life Adapts to Change, Highlands of New Jersey, Highlands Cave, Amber Temporary Exhibition, and Resource Area.

Time Spent in Each Section

As shown in Table 9, visitors spent the most time in the Highlands of New Jersey section (median time of about 4 minutes). Visitors spent similar amounts of time in the Resource Area, Introduction Area, and Life Adapts to Change (each median times of about 3 minutes). Visitors spent the least time in the Amber Temporary Exhibition (median time of about 1 minute).

Table 9
Time Spent in Each Section
(*n* = 50)

Section	Number of Visitors who Stopped	Median Time
Highlands of New Jersey	44	4 min., 13 sec.
Resource Area	29	3 min., 36 sec.
Introduction Area	43	3 min., 26 sec.
Life Adapts to Change	46	3 min., 22 sec.
Highlands Cave	39	2 min., 27 sec.
Forces of Change	41	1 min., 58 sec.
Amber Temporary Exhibition	36	1 min., 6 sec.

Stops Made in Each Section

Nearly all visitors stopped in Life Adapts to Change (92 percent) (see Table 10). More than three-quarters of visitors also stopped in the Highlands of New Jersey, Introduction Area, Forces of Change, and Highlands Cave (88 percent, 86 percent, 82 percent, and 78 percent respectively). The fewest visitors stopped in the Resource Area (44 percent).

Also shown in Table 10, visitors stopped at the most exhibits in the Highlands of New Jersey and Forces of Change (median of 4 stops each). They stopped the fewest times in the Resource Area (median of 1 stop).

Table 10
Stops Made in Each Section
(*n* = 50)

Exhibit Area	% of Visitors who Stopped	Median Number of Stops Made
Life Adapts to Change	92.0	3.0
Highlands of New Jersey	88.0	4.0
Introduction Area	86.0	3.0
Forces of Change	82.0	3.0
Highlands Cave	78.0	4.0
Amber Exhibit	72.0	3.0
Resource Area	42.0	1.0

VISITATION OF INDIVIDUAL EXHIBITS

Time Spent at Each Exhibit

As shown in Table 11, visitors spent the most time at the Survival of the Finchest multimedia (median time of 7 minutes, 11 seconds). Visitors also spent considerable time at the Dynamic Earth Introduction video (median time of 3 minutes, 50 seconds) and the Resource Area (3 minutes, 36 seconds).

Table 11
Exhibits at which Visitors Spent More than Twenty Seconds

Exhibit	*n*	Median Time (Seconds)
Survival of the Finchest multimedia	28	431.5
Dynamic Earth Introduction video	28	230.5
Resource Area activities/videos	21	216.0
Parabolic activity	30	181.5
Make A Fossil Rubbing activity	20	86.0
Where In the World multimedia	24	82.5
Grassland Biome diorama/specimens/panels/video	33	72.0
Highlands of New Jersey diorama/specimens/panels/magnifiers	36	66.0
Cave Formation video	11	59.0
Plants and Insects specimens/panel	19	54.0
Moving Continents, Changing Climates specimens/panels/multimedia	27	49.0
Thank A Tree panel	2	45.5
Reasons For Seasons video	12	40.5
Recycling Crew Log lift panels/video	26	36.5
What Is Amber specimens/panel	23	36.0
Rocks Aglow specimens/panels	37	30.0
Dominican Amber specimens/magnifiers	18	29.5
Limestone panel	4	29.0
Bats! Panel	21	28.0
Follow the Water panels	28	27.0
Baltic Amber: Time Capsules specimens/magnifiers	16	25.5
Fish specimens/panel	17	25.0
Reptiles specimens/panel	23	24.0
Extinction specimen/panel	5	24.0
Ocean specimens/panel	16	22.0
Oak Tree With Bees panels/live bees	17	22.0
Mammals specimens/panel	23	21.0

As shown in Table 12 on the next page, visitors spent the least time at the Nuts about Each Other panel and the Forest That Changes panel (median times of 7 seconds and 4 seconds, respectively). None stopped at the Folded Rock specimen/panel, Life Adapts to Change Introduction panel, Making It Through the Season panel, Winter Green panel, Highlands Cave Introduction panel, or A Hole In the Roof panel

Table 12
Exhibits at which Visitors Spent Less than Twenty Seconds

Exhibit	*n*	Median Time (Seconds)
Tundra Biome diorama/panels	26	19.0
Cave Decorations specimen/panel	21	19.0
Eubrontes Footprint specimen	2	18.0
Highlands of New Jersey Introduction panel	2	18.0
Home Sweet Home panel	4	18.0
Cave Critters activity	19	18.0
Hot Rocks Beneath Your Feet specimen/panels/videos	26	17.0
How High? panel	2	16.0
Whose Fault panel	5	16.0
Baltic Amber: Original Precious specimens/magnifiers	13	16.0
Different Environments, Different Life panel	1	15.0
Rainforest Biome diorama/panels	16	14.0
Natural Selection Fit for Life specimens/panel	9	14.0
Fossils of Prehistoric New Jersey panel	2	14.0
Forces of Change Introduction panel	5	13.0
New Jersey And Africa specimens/panels	8	13.0
Natural Selection video	15	13.0
Fossil Hunt panel/activity	3	13.0
Rocks and Minerals specimens/panel	18	12.5
New Jersey Through the Ages specimens/panels	12	12.5
Petrified Tree Trunk specimen	6	12.0
Turning Off the Plumbing panel	14	12.0
Dynamic Earth Introduction panel	1	11.0
Standing Dead Tree panel	7	11.0
Amber Introduction panel	5	11.0
New Jersey Amber Forest specimens/magnifiers	8	11.0
Den Again activity	4	10.0
Scientists specimens/panel	12	8.5
Amber video	5	8.0
Amazing Amber of New Jersey specimens/magnifiers	10	8.0
Reading New Jersey's Past specimens/magnifiers	8	8.0
Nuts about Each Other panel	2	7.0
Forest That Changes panel	1	4.0
Folded Rock specimen/panel	0	0.0
Life Adapts to Change Introduction panel	0	0.0
Making It Through the Season panel	0	0.0
Winter Green panel	0	0.0
Highlands Cave Introduction panel	0	0.0
A Hole In the Roof panel	0	0.0

Stops Made at Each Exhibit

Visitors could stop at 66 exhibits.[9] As presented in Table 13, the most visitors stopped at the Rocks Aglow specimens/panels and the Highlands of New Jersey diorama/specimens/panels/video/magnifiers (74 percent and 72 percent, respectively).

Table 13
Exhibits at which More than Twenty-five Percent of Visitors Stopped
(*n* = 50)

Exhibit	%
Rocks Aglow specimens/panels	74.0
Highlands of New Jersey diorama/specimens/panels/magnifiers	72.0
Grassland Biome diorama/specimens/panels/video	66.0
Parabolic activity	60.0
Dynamic Earth Introduction video	56.0
Survival of the Finchest multimedia	56.0
Follow the Water panels	56.0
Moving Continents, Changing Climates specimens/panels/multimedia	54.0
Hot Rocks Beneath Your Feet specimen/panels/videos	52.0
Tundra Biome diorama/panels	52.0
Recycling Crew Log lift panels/video	52.0
Where In the World multimedia	48.0
Mammals specimens/panel	46.0
Reptiles specimens/panel	46.0
What Is Amber specimens/panel	46.0
Bats! Panel	42.0
Cave Decorations specimen/panel	42.0
Resource Area activities/videos	42.0
Make A Fossil Rubbing activity	40.0
Plants and Insects specimens/panel	38.0
Cave Critters activity	38.0
Rocks and Minerals specimens/panel	36.0
Dominican Amber specimens/magnifiers	36.0
Fish specimens/panel	34.0
Oak Tree With Bees panels/live bees	34.0
Ocean specimens/panel	32.0
Rainforest Biome diorama/panels	32.0
Baltic Amber: Time Capsules specimens/magnifiers	32.0
Natural Selection video	30.0
Turning Off the Plumbing panel	28.0
Baltic Amber: Original Precious specimens/magnifiers	26.0

[9] For this evaluation, a "stop" was defined as a visitor engaging with an exhibit for three seconds or longer.

The exhibits at which the fewest visitors stopped were all panels (see Table 14 on the following page). Specifically, the fewest visitors stopped at the Dynamic Earth Introduction panel, Different Environments, Different Life panel, and Forest That Changes panel (each 2 percent). No visitors stopped at the Folded Rock specimen/panel, Life Adapts to Change Introduction panel, Making It Through the Season panel, Winter Green panel, Highlands Cave Introduction panel, or A Hole In the Roof panel.

Table 14
Exhibits at which Less Than Twenty-five Percent of Visitors Stopped
(*n* = 50)

Exhibit	%
New Jersey Through the Ages specimens/panels	24.0
Reasons for Seasons video	24.0
Scientists specimens/panel	24.0
Cave Formation video	22.0
Amazing Amber of New Jersey specimens/magnifiers	20.0
Natural Selection Fit for Life specimens/panel	18.0
New Jersey And Africa specimens/panels	16.0
Reading New Jersey's Past specimens/magnifiers	16.0
New Jersey Amber Forest specimens/magnifiers	16.0
Standing Dead Tree panel	14.0
Petrified Tree Trunk specimen	12.0
Forces of Change Introduction panel	10.0
Extinction specimen/panel	10.0
Whose Fault panel	10.0
Amber Introduction panel	10.0
Amber video	10.0
Limestone panel	8.0
Den Again activity	8.0
Home Sweet Home panel	8.0
Fossil Hunt panel/activity	6.0
Eubrontes Footprint specimen	4.0
Highlands of New Jersey Introduction panel	4.0
How High? Panel	4.0
Nuts about Each Other panel	4.0
Thank A Tree panel	4.0
Fossils of Prehistoric New Jersey panel	4.0
Dynamic Earth Introduction panel	2.0
Different Environments, Different Life panel	2.0
Forest That Changes panel	2.0
Folded Rock specimen/panel	0.0
Life Adapts to Change Introduction panel	0.0
Making It Through the Season panel	0.0
Winter Green panel	0.0
Highlands Cave Introduction panel	0.0
A Hole In the Roof panel	0.0

BEHAVIORS AT EXHIBITS

As noted earlier, the observer recorded a series of behaviors: looking at dioramas, reading panels, watching videos, using multimedia, using activities/magnifiers/touchable specimens, having social interactions, and interacting with staff.

In the following sections, tables are provided for each behavior, showing the frequency of that behavior at each exhibit.

Looking at Dioramas

As shown in Table 15, nearly all visitors who stopped at each diorama paid attention to the diorama. The most visitors looked at the Highlands of New Jersey diorama and the Grassland Biome (33 visitors and 30 visitors, respectively). The fewest visitors looked at the Rainforest Biome (15 visitors).

Table 15
Looking at Dioramas

Name of Diorama	Number Visitors that Stopped	Number that Looked
Highlands of New Jersey	36	33
Grassland Biome	33	30
Tundra Biome	26	21
Rainforest Biome	16	15

Reading Panels

As shown in Table 16, the most visitors read Follow the Water, followed by Survival Strategies, and Hyphae (23 visitors, 20 visitors, and 19 visitors respectively).

In terms of graphics, the most visitors paid attention to the Moving Continents, Changing Climates graphics (7 visitors) (also Table 16). In contrast, no visitors looked at these graphics: Follow the Water, Cave Decorations, Good Dirt, or Limestone.

Table 16
Reading at Panels – Most Frequently Read Panels

Name of Panel	Number Visitors that Stopped	Number that Read
Follow the Water standard panel	28	23/0*
Survival Strategies video panel	33	20
Hyphae lift panel	26	19
Grasses and Grass Eaters enhanced panel	33	16
Termite lift panel	26	16
Trapped standard panel	36	16
Mystery Animal enhanced panel	36	14
Bats! enhanced panel	21	14
Keep Water Clean standard panel	28	12
Turning Off the Plumbing pullout panel	14	10/2*
Quality Testers enhanced panel	36	10
Plants and Insects label	19	9
Lion enhanced panel	33	9
Natural Selection Fit for Life enhanced panel	9	9
Different Minerals Glow enhanced panel	37	8
Big Chill standard panel	36	8
Moving Continents, Changing Climates enhanced panel	27	7/7*
Suited Up for Survival standard panel	26	7/3*
Cave Decorations standard panel	21	7/0*
400 Million Years Ago standard panel	12	6
Forces of Change Introduction standard panel	5	5
65 Million Years Ago standard panel	12	5
Understory Story standard panel	16	5/3*
Bee in Season standard panel	17	5
Rocks Aglow enhanced panel	37	5
Amber Introduction standard panel	5	5
Whose Fault standard panel	5	5/1*
Ocean label	16	4
Reptiles label	23	4
Joined Together enhanced panel	8	4
Grasses Weather the Dry Season standard panel	33	4/2*
Good Dirt standard panel	36	4/0*
Limestone standard panel	4	4/0*
Rocks and Minerals label	18	4
Home Sweet Home standard panel	4	4

*At 10 panels, the observer noted whether the visitor looked at the graphics. For each of these panels, the second number listed in the table indicates the number of visitors who looked at the graphics.

Many panels were read by one or no visitors (see Table 17). In fact, no visitors read Folded Rock, Basalt in New Jersey, Life Adapts to Change Introduction, Making It Through the Season, Winter Green, Nuts about Each Other, Highlands Cave Introduction, Fossil Hunt, or A Hole In the Roof.

Table 17
Reading at Panels – Least Frequently Read Panels

Name of Panel	Number Visitors that Stopped	Number that Read
Mammals label	23	3
23 Million Years Ago standard panel	12	3
Weather Report standard panel	33	3/0*
Fish label	17	2
Eubrontes Footprint label	2	2
Rocks Torn Apart standard panel	8	2/2*
Hot Rocks standard panel	26	2/1*
Extinction label	5	2
Africa's Grassland standard panel	33	2
Tropical Rainforest standard panel	16	2
Highlands of New Jersey Introduction standard panel	2	2
How High? standard panel	2	2/2*
Space for Rent standard panel	7	2
Fossils of Prehistoric New Jersey panel standard panel	2	2
Thank A Tree standard panel	2	2/1*
Dynamic Earth Introduction standard panel	1	1
Petrified Tree Trunk label	6	1
Artic Coping with Cold standard panel	26	1
Forest That Changes standard panel	1	1
Life of an Oak standard panel	17	1
Different Environments, Different Life standard panel	1	1/0*
Folded Rock label	0	0
Basalt in New Jersey standard panel	26	0
Life Adapts to Change Introduction standard panel	0	0
Making It Through the Season standard panel	0	0
Winter Green standard panel	0	0
Nuts about Each Other standard panel	2	0/0*
Highlands Cave Introduction standard panel	0	0
Fossil Hunt enhanced panel	3	0/0*
A Hole In the Roof standard panel	0	0/0*

*At nine panels, the observer noted whether the visitor looked at the graphics. For each of these panels, the second number listed in the table indicates the number of visitors who looked at the graphics.

Watching Videos

As shown in Table 18, the *Dynamic Earth* Introduction was the most watched video—all 28 visitors who stopped at this video watched it. Survival Strategies and the long video of the Earth's Core Convection were also frequently watched (18 visitors and 16 visitors, respectively). The fewest visitors watched videos in the Resource Area or both Earth's Core Convection visitors (4 visitors and 2 visitors, respectively).

Table 18
Watching Video

Name of Video	Number Visitors that Stopped	Number that Watched
Dynamic Earth Introduction video	28	28
Survival Strategies video	33	18
Earth's Core Convection (long video)	26	16
Natural Selection video	15	15/10*
Recycling Crew Log lift video	26	15
Reasons For Seasons video	12	12/5*
Cave Formation video	11	11/6*
Earth's Core Convection (short video)	26	6
Amber video	5	5
Resource Area videos	21	4
Earth's Core Convection (both videos)	26	2

*At three videos, visitors activated the video by pushing a button. For each of these videos, the second number listed in the table indicates the number of visitors who pushed the button.

Using Multimedia

Survival of the Finchest was the most used multimedia (20 visitors) (see Table 19). Plate tectonics and Forces of Change were also frequently used (12 visitors and 10 visitors, respectively).

Table 19
Using Multimedia

Name of Multimedia	Number Visitors that Stopped	Number that Used Multimedia
Survival of the Finchest	28	20
Plate Tectonics	27	12
Forces of Change	27	10
Where In the World (left)	24	8
Where In the World (right)	24	8
Where In the World (both)	24	8

Using Activities, Magnifiers, and Touchable Specimens

As shown in Table 20, the Parabolic activity and What is Amber magnifiers were the most used interactive elements (27 visitors and 21 visitors, respectively). The Cave Critters activity and Bats! turn dial were also frequently used (each 16 visitors). In contrast, no visitors used the Folded Rock touchable specimen or Hot Rocks Beneath Your Feet touchable specimen.

Table 20
Using Activities, Magnifiers, and Touchable Specimens

Name of Activity/Magnifier/Specimen	Number Visitors that Stopped	Number that Used Activity
Parabolic activity	30	27
What is Amber magnifiers	23	21
Cave Critters activity	19	16
Bats! turn dial	21	16
Dominican Amber magnifiers	18	14
Make A Fossil Rubbing activity	20	12
Baltic Amber: Time Capsules magnifiers	16	12
Moving Continents, Changing Climates touchable specimens	27	10
Gazelle touchable specimen	33	10
Quality Testers magnifiers	36	10
Baltic Amber: Original Precious magnifiers	13	8
Mystery Animal touchable specimen	36	7
New Jersey Amber Forest magnifiers	8	7
Lion touchable specimen	33	6
Amazing Amber of New Jersey magnifiers	10	6
Reading New Jersey's Past magnifiers	8	5
Petrified Tree Trunk touchable specimen	6	4
Resource Area discovery boxes	21	4
Den Again activity	4	3
Extinction touchable specimen	5	2
Eubrontes Footprint touchable specimen	2	1
Fossil Hunt activity	3	1
Folded Rock touchable specimen	0	0
Hot Rocks Beneath Your Feet touchable specimen	26	0

Social Interactions

Visitors had the most exhibit-related social interactions at the Parabolic activity (27 visitors) (see Table 21 on the following page). Social interactions were frequent at the Grassland Biome, Highlands of New Jersey diorama, and Survival of the Finchest (23 visitors, 22 visitors, and 21 visitors, respectively). The fewest social interactions took place at the Amber video, Scientists specimens/panel, and Reading New Jersey's Past specimens/magnifiers (each 1 visitor).

Table 21
Social Interactions at Exhibits

Exhibit	Number Visitors that Stopped	Number that Had Social Interactions
Parabolic activity	30	27
Grassland Biome diorama/specimens/panels/video	33	23
Highlands of New Jersey diorama/specimens/panels/magnifiers	36	22
Survival of the Finchest multimedia	28	21
Moving Continents, Changing Climates specimens/panels/multimedia	27	19
Recycling Crew Log lift panels/video	26	19
Rocks Aglow specimens/panels	37	19
What Is Amber specimens/panel	23	19
Tundra Biome diorama/panels	26	18
Hot Rocks Beneath Your Feet specimen/panels/videos	26	17
Make A Fossil Rubbing activity	20	17
Resource Area activities/videos	21	17
Bats! panel	21	16
Follow the Water panels	28	15
Where In the World multimedia	24	13
Cave Critters activity	19	12
Dominican Amber specimens/magnifiers	18	12
Rainforest Biome diorama/panels	16	9
Oak Tree With Bees panels/live bees	17	8
Natural Selection video	15	7
Baltic Amber: Time Capsules specimens/magnifiers	16	7
Baltic Amber: Original Precious specimens/magnifiers	13	6
Turning Off the Plumbing panel	14	5
New Jersey And Africa specimens/panels	8	4
New Jersey Through the Ages specimens/panels	12	4
New Jersey Amber Forest specimens/magnifiers	8	4
Extinction specimen/panel	5	3
Reasons For Seasons video	12	3
Cave Formation video	11	3
Den Again activity	4	3
Amazing Amber of New Jersey specimens/magnifiers	10	3
Standing Dead Tree panel	7	2
Fossil Hunt panel/activity	3	2
Amber video	5	1
Scientists specimens/panel	12	1
Reading New Jersey's Past specimens/magnifiers	8	1

Staff Interactions

As shown in Table 22, of the 15 visitors who interacted with staff, 9 did so in the Resource Area. The remaining 6 had staff interactions in both the Resource Area and elsewhere in the exhibition.

Table 22
Staff Interactions at Resource Area

Exhibit	**Number Visitors that Stopped**	**Number that Had Staff Interactions**
Elsewhere in the exhibition	50	6
Resource Area and elsewhere in the exhibition	21	9

II. PRINCIPAL FINDINGS: INTERVIEWS

BACKGROUND INFORMATION

RK&A conducted interviews with a random sample of visitors after they exited *Dynamic Earth* in April 2003. Interviews were conducted with 31 visitors (20 adults and 11 children). Nearly three-quarters of the interviewees were female. Adults ranged in age from 17 to 76 years, with a median age of 43 years. Children ranged in age from 8 to 15 years, with a median age of 11 years. Of visitors approached and asked to participate in the study, two declined to do so, making the refusal rate 6 percent.

VISITATION PATTERNS

All but one adult and one child were first time visitors to *Dynamic Earth*. About one-third of the interviewees came to the exhibition on the recommendation of a friend or family member. About one-third of the adults said they thought the exhibition would be a good place in the Museum to bring children, and, similarly, about one-third of children said their families had brought them. A few interviewees said a Museum guard had recommended the exhibition, and a few said they were trying to see the whole Museum. A couple of adults said they had read about the exhibition in the local paper.

OVERALL VISITOR OPINIONS

All the interviewees enjoyed the exhibition, and most were enthusiastic about their visit, using such words as "fabulous," "cool," "really fun," and "excellent."

Favorite Aspect of the Exhibition

When asked what they enjoyed most about the exhibition, interviewees named numerous components[10]. About one-third of adult and child interviewees were most interested in the opportunity to see objects and artifacts—including rocks, fossils, and taxidermied animals (see the two quotations below). Most of these interviewees explained that they enjoy seeing the "real thing" or that fossils, for instance, interest them. A couple of these children said seeing real objects reinforced what they learned in school.

> [My daughter] was so excited to see the dinosaur bones. When we first came in we saw the zebra and all those different animals and [my children] were asking questions about, what is this and what is that. And the pretty butterflies. [My children] loved those rocks over there . . . they had all those different types of bugs and stuff in those stones, they loved that as well. [Female, 40]

[10] In the analysis that follows, total responses exceed 100 percent of interviewees because many interviewees named more than one favorite aspect of the exhibition.

> Seeing the rocks and minerals [is what I liked best] because that's what I'm learning about in science, and so it was really neat to see all the different kinds. I liked looking at all the fossils and stuff. It was really neat to see different fossils. [Female, 11]

Over one-half of children said they enjoyed seeing animals' habitats, including where animals live, what they eat, and the sounds they make (see the two quotations below). These children cited the cave, the Finch game, and the parabolic as areas where they learned about animals' habitats.

> That bird game [was my favorite exhibit]. (Yeah. Why was that the best part?) Because we had fun challenging each other and finding out about the habitat of the birds. [Female, 11]

> [I liked] searching for the animals and seeing what their sounds were. (Why?) Because I like listening to nature and finding out what [animals] do. [Male, 9]

One-third of all adult and child interviewees really enjoyed the simulated cave habitat. These adults said they liked the experiential, "real" quality of the cave (see the first quotation), and these children (as previously mentioned) said they liked seeing the animals that live in caves (see the second quotation).

> I think the girls [with me] are enjoying the simulated cave. They've been going back and forth in there and [the cave] gives a true life feeling of what it would be like back then. [Female, 41]

> [I liked] the cave. (Why?) Because you got to see the bat with the skeleton and you could see the bugs and stuff and crystals and all that. [Male, 10]

One-third of adults (and one child) named the orientation film as their favorite aspect of the exhibition. These interviewees said the film was extremely helpful in giving them an understanding of what to expect in the exhibition (see the first quotation below). Some said it did an excellent job of showing how the Earth formed or evolved (see the second quotation below).

> Where we first walked in, we saw the movie showing. I thought that was actually interesting just showing how the world was formed. It was a good introduction to what we're going see in here. [Female, 39]

> The movie as you enter is very, very well done, and [it] gives you a very good breakdown of the construction of the Earth, how things happened, and I think [it is good] as a visual thing for a child. . . . It gives [children] an idea of the development of the world around them. [Male, 78]

One-third of children and a few adults said they especially enjoyed the amber exhibit. These interviewees enjoyed the amber because it provided new information, they were surprised to see the insects trapped within (see the quotation below), or because it was "pretty."

> [I liked] the amber part, how the bugs were in the amber and then [how they were] magnified. [Female, 12]

Least Favorite Aspect of the Exhibition

Over one-half of interviewees said there was nothing they did not like about the exhibition. The responses of the remaining interviewees were idiosyncratic and based more on individual preferences (for instance, they did not like a particular exhibit because it was boring) than on problems with the exhibitry. One adult each said they did not like the amber exhibit, the Finch game, the orientation film, the water cycle exhibit, and the text panels. One child each named the fossil rubbing, fossils, text, orientation film, the cave, and insects as items they did not like.

CONVEYING THE CONTENT

New Idea or Information

Interviewees were asked to name at least one new idea or bit of information they had taken from the exhibition. One-third of children said they learned new information about animals' habitats (such as what they eat or where they live), citing the Finch game and the parabolic (see the first two quotations below). One-quarter of adults and children said they learned how the Earth formed (see the third and fourth quotations below). Some cited the orientation film as the component that conveyed this idea, and others cited the plate tectonics multimedia exhibit. One-quarter of adults (and one child) said the formation of amber and consequent trapping of insects was new information (see the fifth quotation). One-quarter of adults said they were surprised to learn there are caves in New Jersey and about the animals living in them (see the sixth quotation). About one-quarter of interviewees said they could think of nothing new they learned.

> I learned about new birds, new habitats. I learned about butterflies and their habitat. [Female, 11]

> I learned what animals eat and stuff and where animals live. [Female, 11]

> I guess the way the continents move. That was pretty interesting that they came together and then apart, and then hook right back together. I mean the amount of change, I was surprised. I didn't know [Earth] had changed that much. I thought it was just a slight breaking apart of land masses to form different continents. But the [exhibition] depicted it as coming together and then breaking apart again, so I really liked that. [Male, 43]

> I learned about, well I studied this in school but I learned more about it [in the exhibition], how when the plates move they can make mountains and oceans. I knew they can make different continents, but I didn't really know they could make mountains and oceans and stuff. [Female, 10]

> [I learned] about how the Amber can . . . there's so much to be learned about fossils of insects just by looking at the beautiful amber. You think of it as jewelry, but what [the amber is] teaching you about natural history is incredible. [Female, 41]
>
> I learned in the cave about the difference between crickets and bats, that they're two different kinds of trochlaphyles [sic] or something, which I had never known before. [Female, 52]

Main Idea

When asked to describe the main idea of the exhibition, interviewees' responses varied slightly; however, three-quarters of adults and children identified something in regard to the changing Earth, citing geologic and/or biologic change. The responses of these interviewees ranged along a continuum, as follows, with nearly equal numbers of visitors saying the exhibition showed:

- General change on Earth over time. (See the three quotations below.)

  > It was basically to show that the Earth is ever-changing and that life recycles itself. That everything is in harmony in nature. [Female, 37]
  >
  > [The exhibition is] trying to teach about nature and how things happened, like survival of the fittest and how things form in nature and everything. [Male, 13]
  >
  > I think [the exhibition] is trying to show you how our world was and what it's like now and all the changes that our world has gone through. [Male, 14]

- The formation and/or evolution of Earth through plate tectonics and volcanoes. (See the two quotations below.)

  > There's the [exhibit] about the globe and it showed you how from different periods, how the plates shifted and how Earth's going to change again. [Male, 15]
  >
  > [The exhibition shows] how the plates moved in action and how the Earth was formed. [Male, 45]

- That animals adapt in response to geologic changes on Earth. (See the two quotations below)

  > [The main idea is] to show you the relationship of time to evolution, and the evolution of animals and how animals adapt to a changing environment. [Female, 66]
  >
  > I think it was showing how different animals and plants survive in different places when land is always moving and changing and stuff like that. [Female, 10]

Interviewees were asked how they came to know this main idea from the exhibition. Most named the orientation film (see the quotation below), but additional responses included the plate tectonics multimedia exhibit, the dioramas, the amber exhibit, and the Finch game.

> I thought the first audiovisual thing was quite excellent, and that gave you the whole context. And that was very striking because I didn't expect it as I came out of the elevator to be hit with something so striking. [Female, 66]

One-quarter of interviewees described the main idea in much broader terms, saying it was to show animals and their habitats or nature in general—as one adult said, "The main idea is that life is everywhere." (See the two quotations below.)

> [The main idea is] all the different animals in the different areas, like on the Savannah and the Polar Bears in the North. I liked that, all the different animals. [Female, 8]

> To appreciate the land where we live. There's a reason why there's dirt. There's a reason why there's water and life and that it came from somewhere and that it recycles itself and comes back again to feed somebody. A tree falls and it becomes food for something and [the main idea] is to appreciate the land we live on and that it's here in New Jersey. [Female, 39]

AMBER GALLERY

Over three-quarters of adult and child interviewees visited the amber gallery. Most of the adults and children who visited the gallery said its main idea was to show how insects become trapped and preserved in amber. When asked to explain the connection of the gallery to *Dynamic Earth*, many adults and children said they did not know. A few adults said the connection was evolution and/or change over time (see the first quotation), and a few adults and children said the connection was to show an example of nature or life on Earth (see the second and third quotations).

> The evolution of time. [The gallery is] talking about geology and the Earth and that represents elements that have occurred over the course of time. [Female, 60]

> Insects are part of science, and it's part of the world because they do stuff in nature. [Female, 11]

> This [exhibition] is mostly about the Earth and that [amber] is also part of nature, the amber and the sap, so it is trying to teach us more about it. [Male, 9]

Of those adults who did not visit the amber gallery, most said it was because their children were not interested. Of those children who did not visit the gallery, a couple said they planned to go on another visit, and one said she was afraid of insects.

STAFF INTERACTION

Over one-half of adults and children said they had no interaction with staff while in *Dynamic Earth* because they had no need for staff. Less than one-half of all the interviewees said they did interact with staff. Of these interviewees, most of the adults said they asked staff for directions or about some other logistical matter, and most of the children said a staff person had explained some aspect of the exhibition's content.

COMPARISON TO OTHER MUSEUMS

All but one adult interviewee had been to another similar exhibition—mostly at the American Museum of Natural History (AMNH) and/or the Liberty Science Center (LSC). Children had a difficult time recalling a similar exhibition, but those who did named AMNH and LSC as well.

When asked to compare *Dynamic Earth* to similar exhibitions, most adults said *Dynamic Earth* was smaller and more manageable (see the first and second quotations). A few adults said *Dynamic Earth* was more hands-on than other similar exhibitions (see the third quotation). The children who could recall other exhibitions said *Dynamic Earth* was no different.

> I think the fact that this [exhibition] is really small and limited makes it much easier to see the evolution of animals and how they live and how they've survived. [Female, 66]

> Yesterday we were at the Children's Museum of Manhattan. This [*Dynamic Earth*] seemed so much calmer and like kids are actually learning. [Female, 41]

> [*Dynamic Earth*] is definitely more interactive and more appealing to children in particular. You're not separated from the exhibit, you're a part of it so it tends to hold your focus more. [Female, 37]

APPENDICES

Removed for proprietary reasons