
# Visitor Study

for the

## Natural History Museum of Utah

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## Executive Summary

During March 2017, Kathy Burke and Kari Nelson conducted a study of visitors to the special exhibition, *The Power of Poison*. The objective of this study was to discover how visitors moved through the exhibition and interacted with it, and how visitors perceived the intended message and related the exhibition to the overall goals of the NHMU. To achieve the objectives of this study, two evaluation methods were used: unobtrusive tracking and timing and cued questionnaires.

Tracking and timing reveals the paths visitors take through an exhibition and how they respond to the exhibition elements.

- 50 adult visitors were randomly selected and unobtrusively observed throughout their time in *Poison*. 26 of the subjects were in groups of adults only, 24 were in groups with children.
- The average time spent was 23 minutes; the average number of stops made was 21 out of a possible 52.
- We used established formulas to measure visitor use of the exhibition (see page 12.) The measurements show that on an average visitors spent more time in this exhibit than most other other special exhibits in this space.

Cued Questionnaires provide feedback on what visitors remember and find meaningful, and on how much they understand the educational concepts and communication goals of the exhibition.

- A sample size of 41 adult visitors completed a questionnaire as they exited the exhibition. The randomly selected sample included 16 subjects in groups of adults only and 25 subjects in groups of adults and children.
- The average stay time was 34 minutes.
- Responses indicated that visitors were interested in and learned from the exhibition. The variety of genres represented (i.e. nature, literature, toxicology) had a wide appeal, but responses only loosely connected to the goals of the Museum.

*The Power of Poison* is among the most thoroughly used exhibitions to be hosted in the NHMU special exhibitions gallery (see comparison table on page 27). Additionally, the broad representation of poison appealed to a variety of interests and visitors frequently reported learning related to the exhibition, but not necessarily the stated goals of the Museum.

## Introduction

The Natural History Museum of Utah (NHMU) featured the exhibition *The Power of Poison* in the Special Exhibits Gallery, October 15, 2016 – April 16, 2017. The exhibition was organized by the American Museum of Natural History, New York. The objective of this study was to discover how visitors moved through the exhibition and interacted with it, and if visitors perceived the intended message and related the exhibition to the overall goals of NHMU.

To achieve the objectives of this study, two evaluation methods were used in accordance with standardized methods established by Beverly Serrell in the publication, Paying Attention: Visitors and Museum Exhibitions.

- Tracking and Timing: data collectors unobtrusively observed 50 visitors and recorded where and how the visitors spent their time in the exhibition, noting particular behaviors that indicate engagement. Additionally, data collectors noted each subject's gender, approximate age, group size, and whether the group was made up of adults only or adults with children.
- Cued Questionnaires: 41 visitors were recruited as they entered the exhibition and asked to complete a questionnaire at the end of their visit to the exhibition.

A total of 91 subjects were included in this study. Data collection for the tracking and timing observations and the cued questionnaire was conducted over a 13-day period in March 2017.

## Tracking and Timing

### Results at a Glance

The tracking and timing study had a sample size of 50 subjects.

- Just over half of the subjects (26) were in groups of adults only; just less than half (24) were in groups with children.
- The average time spent was 23 minutes; the average number of stops made was 21.
- The element with the highest rate of visitor use was element #3, Frogs.
- The most common behaviors were reading and talking.
- The sweep rate index was 304 (see page 12 for an explanation of this index).
- 36% of the visitors were "diligent visitors," visiting at least half the elements in the exhibition.

The metrics collected in tracking and timing studies indicate how thoroughly used an exhibition is by visitors to it. The Power of Poison is among the most thoroughly used exhibitions presented in NHMU's special exhibitions gallery.

## Methods

The methods for this study can be found in the Summative Evaluation Methods Handbook for the Special Exhibit Gallery at the Natural History Museum of Utah created by Serrell and Associates, July 2013. For the first time in Tracking and Timing studies for special exhibitions at NHMU, data collectors used the TrackNTime app created by Oberg Research. The app was installed on an iPad and used by data collectors as described below.

- Tracking and timing (T&T) data was collected from Thursday, March 16, 2017 to Monday, March 26, 2017 during the Museum's regular operating hours.
- The minimum sample size goal was 40. Fifty-three subjects were tracked. Three were removed from the final data set due to incomplete information, resulting in a sample of 50 subjects.
- Visitors were unobtrusively tracked and timed through the exhibition space. Using the TrackNTime app, data collectors made note of the pathways each subject took, where they stopped, and the behaviors they engaged in.
- The app also allowed data collectors to record the time the visitors stayed in the exhibition as a whole, as well as how long they stayed at each element they stopped at.
- The app generates a spreadsheet, from which data was organized to provide us with all measures used in previous studies that used a paper and pencil data collection method.
- A screen shot showing an example of the data collection pages of the app is included as Appendix 2 to this report.

To be a valid subject, a visitor had to make at least one stop, stay at least 1 minute, and not be part of an organized group, e.g., field trips or tour groups. Not all of the subjects were valid subjects. Two of the subjects walked through without stopping, thus their data was deleted from the final data set. One other subject's data was deleted due to incomplete information. The final sample size of the T&T subjects was n= 50.

## Exhibition Elements

The elements identified in the study were determined by Kathy Burke and Kari Nelson and based on a visitor's ability to stop and do something, such as read a label, look more closely at an object in the exhibition, use an interactive, or watch an audiovisual.

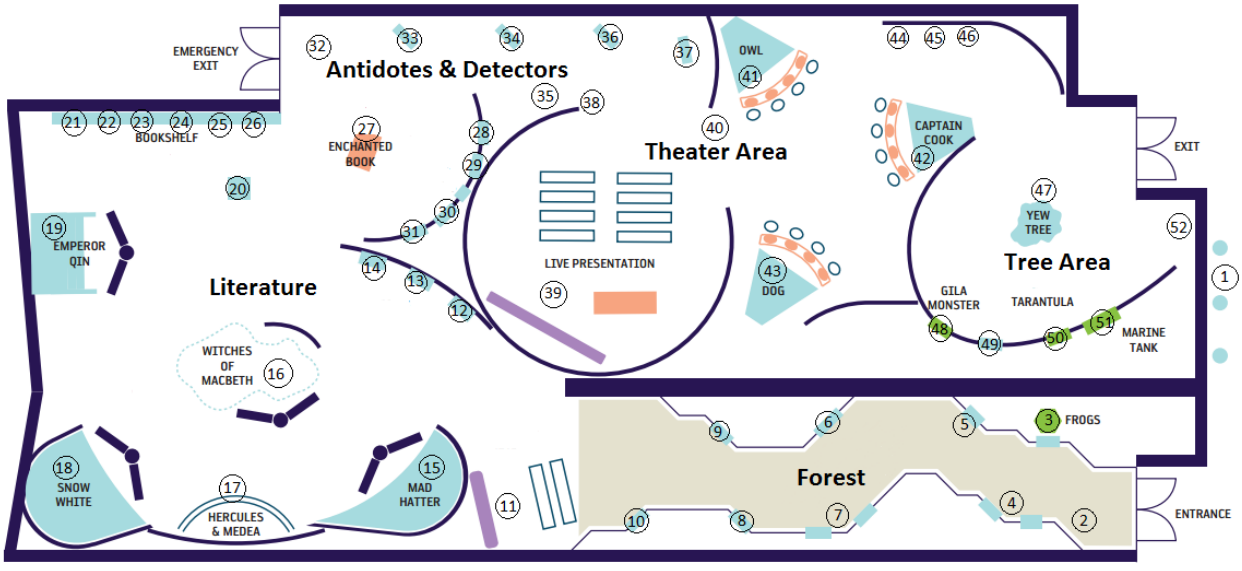
For the purposes of this study, 52 elements were identified in the *Poison* exhibition. These elements consist of text banners and panels, display cases, audiovisual components (indicated by **V** on the list below), and interactive installations (indicated by **I** below). One element, number 39 Poison Lab Theater, was a video presentation that was replaced by an identical live presentation at regularly scheduled times.

## Power of Poison Element List

1. What Makes Poison (Outside)
2. Poison in Nature
3. Frogs
4. Toxic/Armed
5. Liquid Weapon
6. Small Packages
7. Chemical/Wins
8. Snake Venom
9. Breaking Down Defenses
10. Thanks for Poison
11. Tale of Toxins **V**
12. Death from Above
13. Origin of Death
14. Small Animal Poison
15. Mad Hatters
16. Witches
17. Greek Myths
18. Snow White
19. Emperor Qin
20. Cure & Curiosities
21. World Myths
22. Novelists
23. Centuries of Poisoning
24. Sherlock Holmes
25. Children's Books
26. Harry Potter
27. Enchanted Book **I**
28. Antidotes
29. Purifiers
30. Protectors
31. Detectors
32. Detecting Poison (banner)
33. Cleopatra
34. Nero
35. Ponce de Leon
36. Napoleon
37. Lucrezia Borgia
38. Understanding Poison (banner)
39. Poison Lab Theater **V**
40. Poison by Accident (banner)
41. Forest Files **I**
42. Sick at Sea **I**
43. Vet Detectives **I**
44. Vet Detectives Answers **I**
45. Sick at Sea Answers **I**
46. Forest Files Answers **I**
47. Tree
48. Reptile Remedies
49. Microbes
50. Arachnids
51. Ocean Allies
52. Killer Cures

I=Interactive
V=Video/Theater (time)

A full size map is included in this report as Appendix 1.



## Demographics

The sample size of 50 visitors represented the following characteristics:

| Visitor Characteristic | Number of Subjects (Percentage of the Sample n=50) |
|---|---|
| Male | 25 (50%) |
| Female | 25 (50%) |
| Adult | 44 (88%) |
| Senior | 6 (12%) |
| Adult Only (AO) | 26 (52%) |
| Adult with Kids (AK) | 24 (48%) |

Any visitor that appeared to be between the ages of 18-64 was considered an *adult*. Any visitor that appeared to be over 64 years old was considered *senior*.

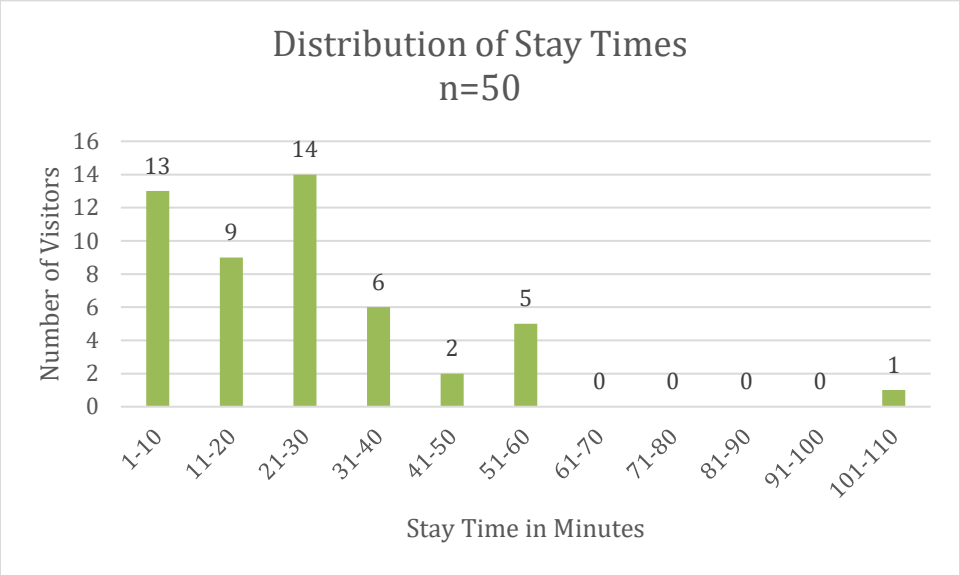
| Group Size (includes AO and AK) | Number of Subjects (Percentage of the Sample n=50) |
|---|---|
| 1 | 7 (14%) |
| 2 | 16 (32%) |
| 3 | 9 (18%) |
| 4 | 10 (20%) |
| 5+ | 8 (16%) |

| Day of the Week | Number of the Sampled Collected (Percentage of the Sample n=50) |
|---|---|
| Monday | 4 (8%) |
| Tuesday | 3 (6%) |
| Wednesday | 4 (8%) |
| Thursday | 12 (24%) |
| Friday | 8 (16%) |
| Saturday | 11 (22%) |
| Sunday | 8 (16%) |

## Stay Times

Stay time of the 50 subjects ranged from 1 minute to 105 minutes. The average stay time was 23 minutes.

The graph below shows the distributions of time (in minutes) subjects spent in the exhibition.




**Shortest stays:** Three separate subjects had a stay time of either 1 or 2 minutes, with just one stop. All 3 subjects (subject numbers 8, 31 and 58) stopped only at element #1, which was located just outside of the main exhibition entrance. None of the subject groups entered the main exhibition gallery. We decided to keep these times in the data set considering that this was a pattern seen among both subjects and non-subjects during data collection, and thus was representative of typical visitors. (See Further discussion of the exhibition approach area on page 28.)

Among the subjects that did enter the main exhibition gallery, the shortest stay was by a single senior male (subject number 61) on Wednesday, March 22. This subject stayed just 2 minutes and stopped at 2 elements. The data collector noted that he appeared to be looking for someone. He turned around after the second stop and exited through the entrance.

**Longest stay:** The longest stay time was for a senior male (subject #28) who spent 105 minutes in the exhibition and stopped at 41 of the 52 elements. This visitor was with one other senior. The data collector noted that the subject did not speak in English but appeared to read everything at each stop he made. The TrackNTime app records time spent at each individual exhibition element. While a few minutes of his time early in the exhibition were spent waiting for his companion who stepped out

of the exhibition, the total time recorded at elements was nearly 91 minutes, meaning he had approximately 14 minutes of "down time" – time spent in the exhibition but not at a specific element. While this is more down time than other visitors, it is not nearly the 51 minutes that separates him from the next longest stay time of 54 minutes. Additionally, his stop times recorded for individual elements later in the exhibition were just as long as for earlier elements.

Calculating an average time was a tricky proposition with such a wide range, and considering that the visitors with the shortest and longest stay times had circumstances worth considering.

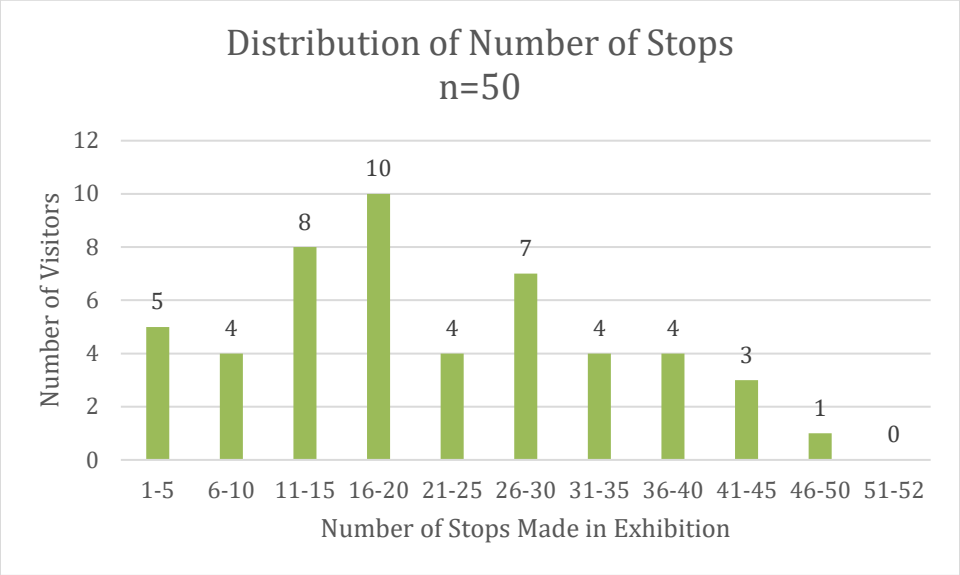
- The average time spent by all observed subjects was 25 minutes.
- With the longest stay outlier removed, the stay time is 23 minutes.
- With both the single-stop visitors and the longest stay outlier removed, the average time spent was 24 minutes.

When examining the distributions of stay times graph above, and the scatter plot on page 12, the single-stop visitors are within close proximity to other visitors who stopped at more elements, while the visitor with the longest stay time is clearly an outlier. Nevertheless, his stops and behaviors fall into normal ranges. For this reason, the visitor with the longest stay time will be removed from the calculation of the average stay time, but will remain as part of the data set for all other metrics used in this report.

## Number of Stops

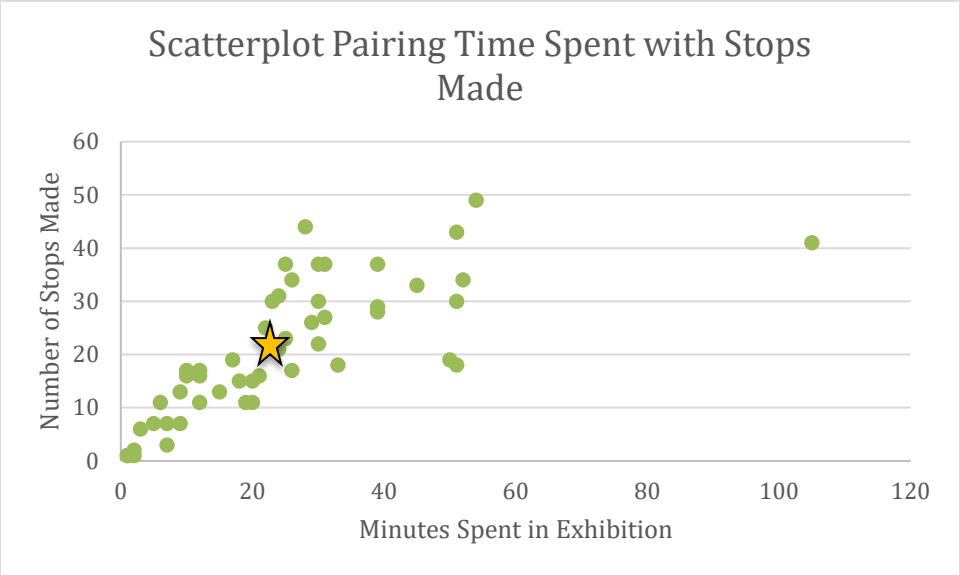
- The number of stops made by subjects ranged from 1 to 50 stops, out of 52 exhibition elements.
- The average number of stops made by subjects was 21 or 40% of the elements.
- 32 subjects stopped at less than half of the elements (26 or less).
- 18 subjects stopped at more than half of the elements (27 or more).
- No subjects stopped at all of the elements.

The graph below shows the distribution of number of stops subjects made in the exhibition.




## Time and Stops Correlation

The graph below shows the time subjects spent in the exhibit in relation to the number of stops they made.




- Each blue dot represents one subject
- Times range from 1 to 105 in minutes. Stops ranged 1 to 50. The maximum possible number of stops was 52.
- The average time (23 minutes) and the average stops (21) are marked with an orange star.

## Comparison of Subjects with and without Children

Our sample included 24 adult visitors with children and 26 adults without children. On average, adults with children stayed 24 minutes and made 19 stops. On average adults without children stayed 23 minutes and made 24 stops. This exhibition differs from others in that adults with children had a slightly longer stay than adults without. The pattern we typically see is both longer stay time and more stops for adults without children

## Diligent Visitors & Sweep Rate Index

In the book Paying Attention: Visitors and Museum Exhibitions, Serrell establishes a method of measuring visitor use of exhibits. Two of those methods are the calculation of "diligent visitors" and the "sweep rate index."

Diligent visitors (DV) are those visitors who stopped at more than half of the elements in the exhibition. The sweep rate index (SRI) is one way to think about visitors' time spent in an exhibition. It is calculated by dividing the size of the gallery (square footage) by the average time spent (minutes). The SRI is an index for time and space. Using the SRI calculation allows comparisons across different sizes of exhibitions and museums. Lower sweep rates are good. Exhibitions with low sweep rates (<300) and high percentages of diligent visitors (>50%) are "exceptionally thoroughly used exhibitions", indicating a majority of visitors were engaged (e.g., spent time looking, reading, watching media) with more than half the elements.

**Diligent Visitors**

The "percentage of diligent visitors? (%DV) is the number of people who stopped at more than half the elements (in this case, 20 visitors stopped at 26 or more elements) divided by the number of subjects in the sample (in this case, 49).

$$\%DV = (18/50)x100$$
$$\%DV = 36\%$$

The percentage of diligent visitors to the *Poison* exhibition was 36%. For comparison, in Serrell's study of 110 exhibitions in Paying Attention, the mean % DV was 26%. (Note that the 110 exhibitions in Serrell's study are not a random sample, but rather a database of exhibitions.)

**Sweep Rate Index**

The sweep rate index is calculated by dividing the exhibition square footage (7000 square ft. in *Poison*) by the average time (23 Minutes).

$$SRI = 7000/23$$
$$SRI = 304$$

The SRI for *The Power of Poison* was 304. Exhibitions with SRIs less than 300 are considered exceptionally well used, suggesting that visitors spent a good amount of time in an exhibition considering its size. In Serrell's study of 110 exhibitions the median SRI was 296.

*The Power of Poison* sweep rate falls only slightly above the 300 SRI benchmark, and thus can still be considered well used. See page 27 for a comparison of DV and SRI to other NHMU special exhibits.

## Attracting Power of Elements

Attracting power of elements is the measure of the percentage of visitors who were attracted to stop at an element. The list ranks elements in descending order, from the elements with the highest attracting power to those with the lowest.

| Element | Number and (%) of Subjects Who Stopped |
|---|---|
| 3 Frogs | 44 (85%) |
| 7 Chemical Wins | 37 (71%) |
| 1 What Makes Poison (outside exhibit entrance) | 36 (69%) |
| 15 Mad Hatters | 35 (67%) |
| 19 Emperor Qin | 35 (67%) |
| 16 Witches | 34 (65%) |
| 4 Toxic/Armed | 33 (63%) |
| 6 Small Packages | 33 (63%) |
| 5 Liquid Weapon | 33 (63%) |
| 18 Snow White | 32 (62%) |
| 11 Tale of Toxins **V** | 31 (60%) |
| 8 Snake Venom | 29 (56%) |
| 12 Death from Above | 28 (53%) |
| 27 Enchanted Book **I** | 28 (53%) |
| 39 Poison Lab Theater **V** | 27 (52%) |
| 9 Breaking Down Defenses | 25 (48%) |
| 10 Thanks for Poison | 25 (48%) |
| 13 Origin of Death | 24 (46%) |
| 51 Ocean Allies | 24 (46%) |
| 17 Greek Myths | 23 (44%) |
| 36 Napoleon | 22 (42%) |
| 14 Small Animal Poison | 21 (40%) |
| 22 Novelist | 21 (40%) |
| 26 Harry Potter | 21 (40%) |
| 42 Sick at Sea **I** | 21 (40%) |
| 43 Vet Detectives **I** | 20 (38%) |

| Element | Number and (%) of Subjects Who Stopped |
|---|---|
| 21 World Myths | 18 (35%) |
| 34 Nero | 18 (35%) |
| 48 Reptile Remedies | 18 (35%) |
| 25 Children's Books | 17 (33%) |
| 28 Antidotes | 17 (33%) |
| 41 Forest Files **I** | 17 (33%) |
| 33 Cleopatra | 15 (29%) |
| 35 Ponce de Leon | 15 (29%) |
| 37 Lucrezia Borgia | 15 (29%) |
| 24 Sherlock Holmes | 14 (27%) |
| 20 Cures & Curiosities | 13 (25%) |
| 29 Purifiers | 13 (25%) |
| 30 Protectors | 13 (25%) |
| 44 Vet Detective Answers **I** | 13 (25%) |
| 47 Tree | 13 (25%) |
| 50 Arachnids | 13 (25%) |
| 23 Centuries of Poisoning | 12 (23%) |
| 31 Detectors | 10 (19%) |
| 45 Sick at Sea Answers **I** | 10 (19%) |
| 46 Forest Files Answers **I** | 9 (17%) |
| 52 Killer Cures | 9 (17%) |
| 49 Microbes | 8 (15%) |
| 2 Poison in Nature (banner) | 7 (13%) |
| 32 Detecting Poison (banner) | 4 (8%) |
| 40 Poison by Accident (banner) | 4 (8%) |
| 38 Understanding Poison (banner) | 1 (2%) |

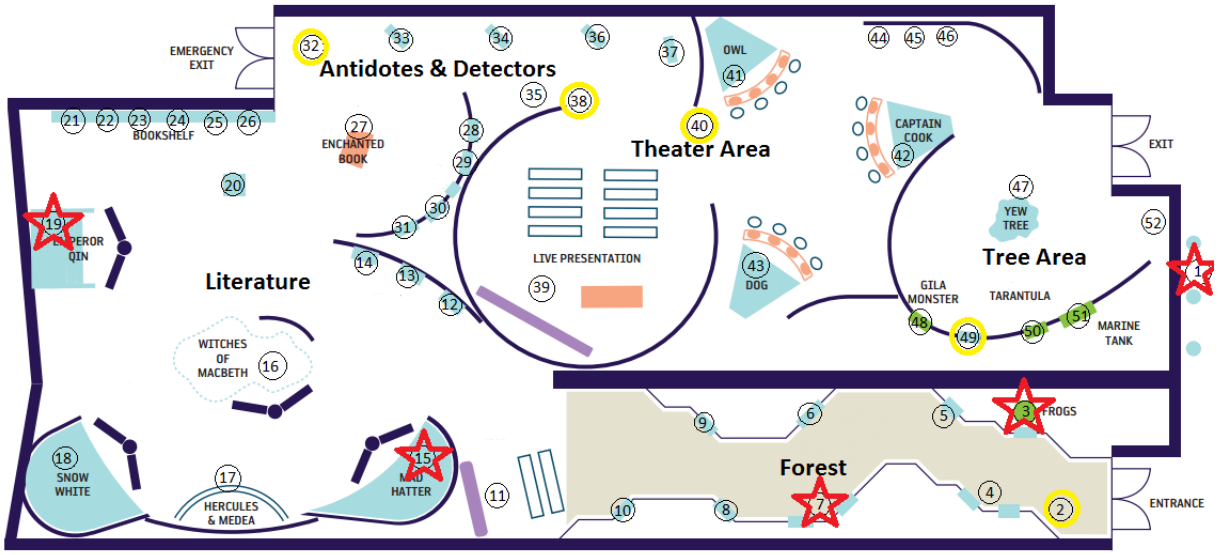
## 5 most visited elements

| Element | Number of Subjects Stopping (n=50) |
|---|---|
| 3 Frogs | 44 |
| 7 Chemical Wins | 37 |
| 1 What Makes Poison (outside exhibit entrance) | 36 |
| 15 Mad Hatters | 35 |
| 19 Emperor Qin | 35 |

## 5 least visited elements

| Element | Number of Subjects Stopping (n=50) |
|---|---|
| 49 Microbes | 8 |
| 2 Poison in Nature (banner) | 7 |
| 32 Detecting Poison (banner) | 4 |
| 40 Poison by Accident (banner) | 4 |
| 38 Understanding Poison (banner) | 1 |

On the map below the 5 most visited elements are marked with red stars. The least visited elements are marked with yellow circles.




All of the most used elements were in the first half of the exhibit. Four out of five of the least used elements were banners explaining or introducing the different exhibit areas.

### Stay times at individual elements

Where Attracting Power considers the number of subjects who stopped at an exhibition element, the TrackNTime app allows us to record time spent at each exhibition element, and consider this data for a more well-rounded definition of element "use."

| Element | Average time in seconds |
|---|---|
| 39 Poison Lab Theater **V** | 209 |
| 11 Tale of Toxins **V** | 124 |
| 27 Enchanted Book **I** | 112 |
| 42 Sick at Sea **I** | 105 |
| 43 Vet Detectives **I** | 86 |
| 41 Forest Files **I** | 81 |
| 19 Emperor Qin | 65 |
| 15 Mad Hatters | 64 |
| 17 Greek Myths | 62 |
| 18 Snow White | 61 |
| 7 Chemical/Wins | 58 |
| 3 Frogs | 49 |
| 16 Witches | 46 |
| 46 Forest Files Answers **I** | 44 |
| 6 Small Packages | 39 |
| 9 Breaking Down Defenses | 39 |
| 52 Killer Cures | 39 |
| 20 Cure & Curiosities | 37 |
| 29 Purifiers | 37 |
| 4 Toxic/Armed | 36 |
| 13 Origin of Death | 35 |
| 51 Ocean Allies | 33 |
| 48 Reptile Remedies | 31 |
| 5 Liquid Weapons | 30 |
| 8 Snake Venom | 30 |
| 10 Thanks for Poison | 30 |

| Element | Average time in seconds |
|---|---|
| 12 Death from Above | 29 |
| 33 Cleopatra | 29 |
| 14 Small Animal Poison | 28 |
| 1 What Makes Poison | 26 |
| 28 Antidotes | 26 |
| 31 Detectors | 26 |
| 44 Vet Detectives Answers **I** | 26 |
| 21 World Myths | 23 |
| 30 Protectors | 23 |
| 47 Tree | 23 |
| 32 Detecting Poison (banner) | 21 |
| 36 Napoleon | 21 |
| 37 Lucrezia Borgia | 21 |
| 22 Novelists | 20 |
| 23 Centuries of Poisoning | 19 |
| 25 Children's Books | 19 |
| 45 Sick at Sea Answers **I** | 19 |
| 50 Arachnids | 18 |
| 34 Nero | 17 |
| 35 Ponce de Leon | 17 |
| 26 Harry Potter | 15 |
| 2 Poison in Nature (banner) | 14 |
| 49 Microbes | 13 |
| 24 Sherlock Holmes | 12 |
| 38 Understanding Poison (banner) | 7 |
| 40 Poison by Accident (banner) | 7 |

## Pairing of most/least visited elements with longest/shortest stay times

| 5 most visited elements | 5 elements with longest times |
|---|---|
| 3 Frogs | 39 Poison Lab Theater **V** |
| 7 Chemical Wins | 11 Tale of Toxins **V** |
| 1 What Makes Poison (outside exhibit entrance) | 27 Enchanted Book **I** |
| 15 Mad Hatters | 42 Sick at Sea **I** |
| 19 Emperor Qin | 43 Vet Detectives **I** |

| 5 least visited Elements | 5 elements with shortest times |
|---|---|
| 49 Microbes | 2 Poison in Nature (banner) |
| 2 Poison in Nature (banner) | 49 Microbes |
| 32 Detecting Poison (banner) | 24 Sherlock Holmes |
| 40 Poison by Accident (banner) | 38 Understanding Poison (banner) |
| 38 Understanding Poison (banner) | 40 Poison by Accident (banner) |

If the table comparing elements with the most visits and longest times were expanded to 10, we would see an overlap with two elements – Mad Hatters, Snow White, and Emperor Qin. Overlap in the table of least visited and shortest stay time is clear, and of the four that overlap, three are freestanding text banners. A discussion of attraction of exhibition elements is included in the discussion section of this report on page 28.

## Visitor Behaviors

During an observation, data collectors noted the following behaviors as they occurred: reading, reading out loud, pointing, using an interactive, and calling over. Behaviors such as these suggest engagement, which lead to learning in a museum exhibition.

The table below shows the number of subjects that engaged in these behaviors, ranked in descending order.

| Behavior | Number of Subjects (% of Sample) n=50 |
|---|---|
| Read | 47 (94%) |
| Talk | 42 (84%) |
| Touch/Manipulate | 31 (62%) |
| Read out-loud | 27 (54%) |
| Point | 27 (54%) |
| Call over | 8 (16%) |

A comparison of behavior rates in other exhibitions shows that these numbers are fairly typical, with this exhibition being the highest in reading out-loud, but normal in all other behaviors. A full comparison of behaviors across all exhibitions in this space can be found on page 28.

# Cued Questionnaires

## Questionnaire Results at a Glance

- The Cued Questionnaire (CQ) study had a total sample size of 41.
- The randomly selected sample included 16 subjects in groups of adults only, and 22 subjects in groups of adults and children.
- 25 (61%) of the subjects were first time visitors to NHMU. Repeat visitors (16, or 39% of the subjects) reported visiting as infrequently as once per year to as often as once per month, with most in the range of 1-2 visits per year.
- Just one subject (2%) indicated that they were a member of NHMU, compared to 13% in the Genome visitor study and 15% in the *Geckos Live* study.
- 5 (12%) of the subjects indicated having a special interest, knowledge, or training in poisons and venom found in nature or described by literature.
- The average time visitors spent in the exhibition was 34 minutes, with a range of 8-75 minutes.
- Responses indicated that visitors were interested in and learned from the exhibition, but suggested only weak connection between the exhibition and stated purposes of the Museum.

## Cued Questionnaires - Introduction and Methods

Cued Questionnaires provide feedback on what visitors remember and find meaningful, and on how much they understand the educational concepts and communication goals of the exhibit.

- 41 visitors participated in this cued questionnaire (CQ) study. This sample size is solidly within Serrell's recommended 30-50 subjects.

- Cued questionnaire were distributed over ten days (both weekdays and weekend days) between Satuday, March 18th and Tuesday, March 29th, 2017.

- As visitors approached the entrance of *The Power of Poison*, they were invited to participate in the study after going through the exhibition.

- Each visitor who agreed was given a paper card with a number and their entrance time written on it. The number was used to keep track of how many subjects had been recruited that day.

- When the subjects completed their visit, they returned to the data collector, who recorded their entrance and exit time on the data collection sheet. The data collector asked and recorded demographic information, then invited the visitor to fill out the remainder of the questionnaire on their own.

- A total of 41 visitors were invited to participate in the study and all completed questionnaires. Approximately 4 additional visitors were invited to participate and agreed to, but then did not return to the data collector after their visit.

- Demographic information was analyzed to determine the characteristics of the sample size.

- Open response items were analyzed using inductive approach, meaning we look for patterns in the subjects' own words to determine themes, and then sorted responses according to those themes. These themes were then considered in relation to the purposes of the Museum (as established by NHMU staff for a 2013 whole-museum study)

## Demographics of the Cued Sample

The sample of 41 visitors had the following characteristics:

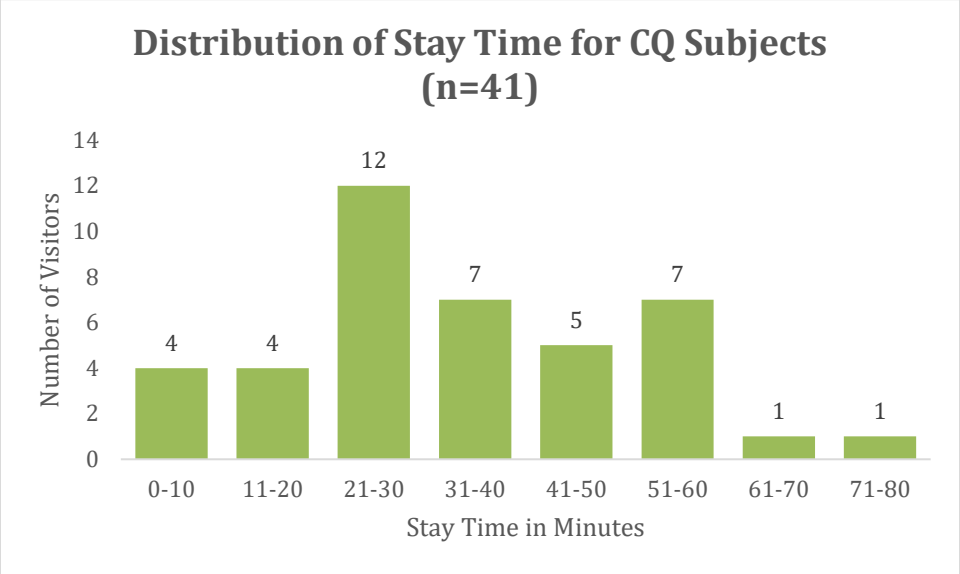
| Characteristic | Number of Subjects (Proportion of the Sample) |
|---|---|
| Female | 25 (61%) |
| Male | 16 (39%) |
| Adults Only | 16 (39%) |
| Adults with Kids | 25 (61%) |
| Group Size 1 | 4 (10%) |
| Group Size 2 | 9 (22%) |
| Group Size 3 | 12 (29%) |
| Groups Size 4 | 9 (22%) |
| Groups Size 5+ | 7 (17%) |
| First Time Visitor to NHMU | 25 (61%) |
| Repeat Visitor to NHMU | 16 (39%) |
| Member | 1 (2%) |
| Special Interest in Exhibition Topic | 5 (12%) |

**Visitors with Special Interest**
5 (12%) of the visitors who completed the cued questionnaire said yes, they "had a special interest, knowledge or training in poisons and venom found in nature or described by literature." This is lower than in most other CQ studies (see comparison table on page 28) but not surprising considering unusual content and broad representation of the subject.

## CQ Time Spent

- Visitor stay times ranged from 8 minutes to 75 minutes, with an average stay time of 34 minutes. There were no significant outliers on either end of the range, so the mean was only slightly lower at 31 minutes. This is one of the highest stay times among recent special exhibitions (see comparison table on page #.) Nevertheless, only 2 out of 41 of the CQ subjects in Poison spent more than one hour in the exhibition. In *Genome*, 9 out of the 32 (28%) CQ subjects spent more than one hour in the exhibition, and in the two studies prior to that (*Geckos Live!* and *Birds of Paradise*), no visitor stayed in the exhibition more than one hour.

- Visitors in the Timing & Tracking study conducted for *Poison* spent an average of 25 minutes in the exhibition. The longer average visit of cued subjects (34 minutes) is not unexpected. Because cued subjects know they will be speaking with a data collector after their visit, it is typical for them to spend a longer time in the exhibition.



## CQ Visitor Responses to Open-Ended Questions

### Overall, what would you say is the main purpose of the displays in these galleries?

The first open-ended question in the questionnaire was: "Overall, what would you say is the main purpose of the displays in these galleries?" This was followed by two prompts: “To show… " and "To make people… "

We know from past studies that visitors tend to respond to the prompt “To show…” by describing the content of an exhibition (what the museum presented), and that they tend to respond to the prompt “To make people…” by describing what they perceive to be the intended impact of the exhibition.

**To show...**

These responses were analyzed inductively - identifying patterns in the subjects' own words to determine themes, and then sorting responses according to those themes. Two main themes emerged from the responses: the occurrence of poison in nature, and poisons in history and literature. Other themes also appeared, however less frequently, including warnings, precautions and preventions, and the duality of poison’s harmful and yet healing qualities. Commonly, subjects included two distinct ideas in their response. Most commonly, responses paired poison in history and in nature. Example responses follow.

Poisons in history and literature (13 responses)

> “Animals that have poisons and what people have used those poisons for.”
>
> “Unknown facts on poison in history and writing.”
>
> “How poisons have been used through history and how animals use poison to protect themselves.”

The occurrence of poison in nature (13 responses)

> "To show how nature uses poison to protect itself, and how humans can learn to use these poisons for good.”
>
> “To educate visitors about various origins and uses for poisons found in nature.”

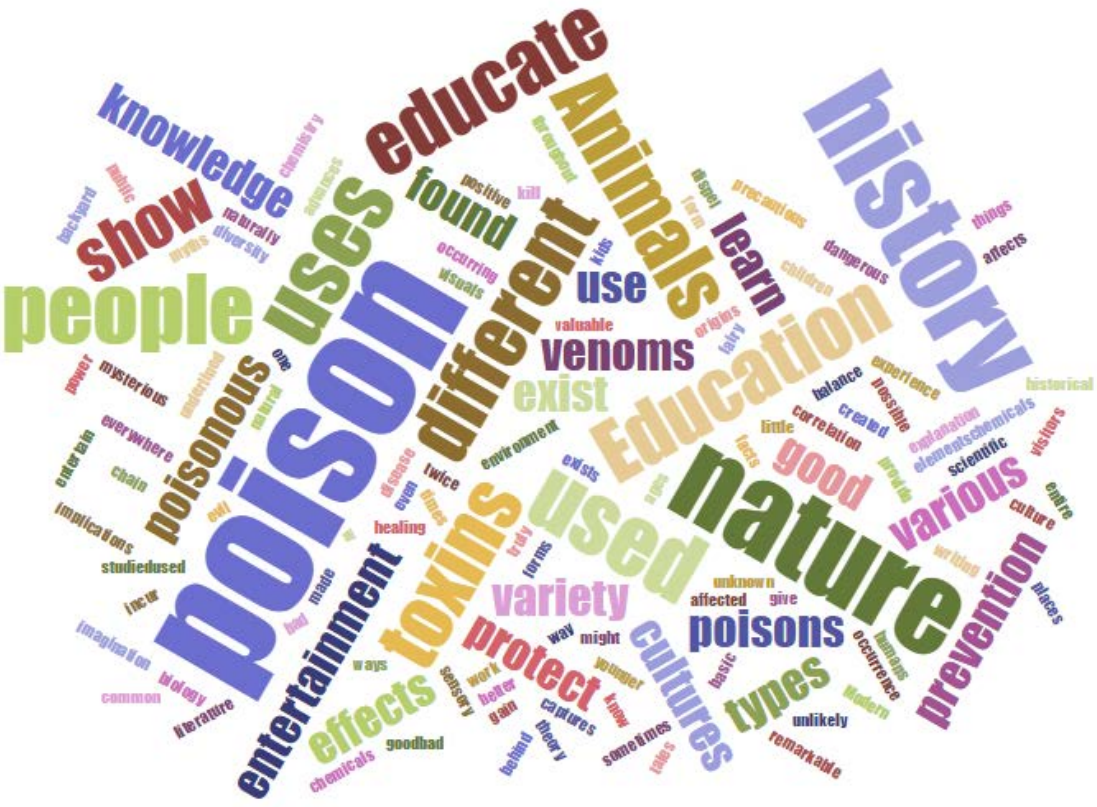
Other (14 responses)

> “The public that there are sometimes dangerous chemicals that can be found in common unlikely places (even your own backyard).”
>
> “That elements/chemicals can be used in a variety of good/bad ways. Modern advances incur own knowledge.”
>
> “To show how nature uses poison to protect itself, and how humans can learn to use these poisons for good.”
>
> “To educate the uses of toxins throughout the ages, both positive and a little evil.”

Responses referred to the content generally, without referring to specific elements of the exhibition. Most responses either explicitly or implicitly referred to an underlying purpose of education, but three also specifically mentioned entertainment. Two subjects used simple, single word response: “education” and “poison.”

The word cloud below gives a visual representation of word frequencies in the responses. The larger a word appears in the cloud, the more often it occurred in the data. The responses confirm

Serrell's premise that visitors tend to respond to this prompt by describing the content of an exhibition (what the museum presented).




**To make people...**

Serrell suggests that visitors tend to respond to the prompt "To make people…" by describing what they perceive to be the intended impact of the exhibition. These responses were also analyzed inductively - identifying patterns in the subjects' own words to determine themes, and then sorting responses according to those themes.

The primary theme that emerged from these responses related to raising awareness while understanding the potential dangers and benefits of poisons (24 responses). A second, similar theme related to thinking more deeply, being curious, and raising interest (12 responses). Example responses follow.

Example responses, "To make people…"

- " aware of the prevalence and uses of poison and how important it is."
- " aware of poisons and to educate on the dangers and misperceptions of poisons."
- "engage w/ the science and intellectual history we can understand by thinking about toxins."
- "more curious about poison"

## What is one new idea you are taking away with you?

The second set of open ended questions was "What is one new idea you are taking away with you?" followed again by two prompts: "I didn't know, or I never realized that..." and "and/or it reminded me that..."

These prompts indicate ideas or information that are new to the visitor and suggest the exhibition is motivating learning.

**I didn't know, or I never realized that...**

The responses to this prompt were highly diverse - no predominate themes emerged from them. Perhaps the most common sentiment noticed among the responses was the idea of poison's prevalence, but even these responses were divided among its prevalence in nature, literature, history, and use:

> "the subject was so vast."
> "there were so many venomous animals.
> "how much of a role poisons played in historical deaths."

While these answers referred to the exhibition generally, the majority of responses (28) cited specific content in the exhibition. Even so, there was still great variety among the responses, suggesting that the breadth of ideas presented was able to strike a chord with a wide variety of visitor interests.

*I didn't know, or I never realized that…*

> "salt could potentially be poisonous."
> "birds could be poisonous or that people tried to use fossils to cure poison."
> "the cosmetics used arsenic."
> "Mad hatter disease was caused by mercury in their hat making materials."
> "the Chinese emperor thought he could become an immortal by taking poison."

**And/or it reminded me that...**

Twelve (29%) of subjects did not respond to this prompt, simply leaving it blank. This is considerably higher than non-response rates to this prompt in studies of previous exhibitions in this space (for example, 19% in *Genome* and 14% in *Pigeons*.) Most of the responses that were provided echoes the responses to the earlier prompts – some general ideas and some specifically referencing the exhibition.

*And/or it reminded me that...*

> "there is always more to learn about our world."
> "many medicines are derivatives of poisons."
> "poisons have an interesting history and have been used for 100s of years as a method of murder."
> "poison exists all around us. Although much of it serves purpose, we must be responsible."

## Connections to Stated Goals of NHMU

We took one last pass through all the responses, this time deductively – looking for evidence supporting the purposes of the Museum, established by NHMU staff as part of a whole-museum study in 2013:

1. To make people appreciate the world around them, and instill or reinforce the fact that humans [people] are part of the natural world.
2. To make people better understand the state, including the sciences that make it what it is, the cultures that have lived here before Anglo-Americans, and biological and other sciences.
3. To make people consider their own place in this web and nurture their connection to the natural world.
4. To make people appreciate this extraordinary place, appreciate how amazing nature truly is, and think carefully about choices they make about the future as well as how they live their daily lives.

As described in the above sections, responses often referred to nature, and perhaps how amazing it is, but subjects did not necessarily relate it to themselves. For example:

*To make people…*

> "aware of what types of poisons/venoms found in nature and how they've been used."

When subjects did relate it to themselves, particularly related to statement 4, the choices they suggested making were more about protecting themselves, rather than protecting nature and the environment. For example:

*To make people…*

> "aware, educated about things we come in contact with and teach our children to be more aware of things they contact/see."

The most frequent connection we saw were related to statement 1. Nevertheless, there were only 11 clear examples among the nearly 160 responses. Examples:

*To show…*

> "the public that there are sometimes dangerous chemicals that can be found in common unlikely places (even your own backyard)."

*To make people…*

> "understand and appreciate the value of things created in the natural world around us."

There was a clear lack of connection with statement 2. While subjects often mentioned nature, there were no references to the state of Utah among the responses.

## Anything else?

The final open-ended question of the cued questionnaire was: "Anything else?" This prompt gives the subjects the chance to comment on things that made an impression upon them, but may not have fit as a response to earlier prompts.

Seventeen subjects (41%) responded to this prompt. As in other studies, most subjects used the space to generally compliment the exhibition:

> "It was really good and done in a fun way."
> "Very informative and entertaining. I really enjoyed this exhibit."

A few subjects referred specifically to content or the design:

> "solving the mysteries and the visuals portraying historical figures. I.e. Cleopatra, Napoleon, etc."
> "Loved the presenter =)"

> "We have taken museum practices and have designed/critiqued exhibits, and were very impressed with the design of this exhibit – esp (sic) for a travelling exhibit. The book thing was super cool! We had a lot of fun!"

> "It had a creepy feeling which was appropriate."

## Special Exhibition Study Comparisons

This section compares the Tracking and Timing and Cued Questionnaire data from all visitor studies of exhibitions in the NHMU special exhibitions gallery.

Comparison of Tracking and Timing Elements, Stay Times, DVs, and SRIs

| Exhibitions | Number of Elements | Average # of Stops | Average Stay Time | %DV | SRI | % Adults only/% Adults with children |
|---|---|---|---|---|---|---|
| Power of Poison | 52 | 21 | 23 min.* | 36% | 304 | 24/19 |
| Genome | 41 | 12 | 21 min. | 11% | 333 | 57/43 |
| Geckos Live | 51 | 21 | 19 min. | 19% | 263 | 38/62 |
| Birds of Paradise | 49 | 14 | 18 min. | 16% | 278 | 39/61 |
| Extreme Mammals | 55 | 17 | 14 min. | 16% | 466 | 32/68 |
| The Horse | 58 | 22 | 24 min. | 27% | 291 | 33/67 |
| Chocolate | 50 | 22 | 19 min. | 44% | 317 | 43/48 |
| Weaving a Revolution | 34 | 10 | 21 min. | 20% | 333 | 71/29 |

**See the discussion on page 11 related to the average stay time in the exhibition.*

Comparison of the numerical aspects of cued questionnaire

| **Exhibition** | ***Poison (April 2017)*** | ***Genome (September 2016)*** | ***Geckos Live! (April 2016)*** | ***Pigeons (Jan. 2016)*** | ***Extreme Mammals (May 2015)*** | ***Horse (Nov. 2014)*** | ***Weaving A Revolution (April 2013)*** |
|---|---|---|---|---|---|---|---|
| **Sample Size** | 41 | 32 | 40 | 30 | 40 | 30 | 35 |
| **%Adults only groups /%Adults with children** | 39/61 | 69/31 | 60/40 | 52/48 | 40/60 | 45/55 | 80/20 |
| **Most common group size** | 3 | 2 | 2 | 2 | 2 | 2 | 3 |
| **% Visitors with special Interest** | 12 | 34 | 8 | 7 | 33 | 42 | 54 |

**Cued Questionnaires were not gathered for Chocolate: The Exhibition*

Comparisons rates of behaviors observed in the Tracking and Timing studies

| Exhibition | Read | Talk | Use Interactive | Watch Video | Point | Read Out-loud | Call Over |
|---|---|---|---|---|---|---|---|
| The Power of Poison | 94% | 84% | 62% | N/A | 54% | 54% | 16% |
| Genome | 97% | 84% | 80% | 58% | 49% | 16% | 11% |
| Geckos Live | 66% | 91% | 72% | 49% | 89% | 40% | 23% |
| Birds of Paradise | 76% | 80% | 80% | 94% | 53% | 22% | 22% |
| Extreme Mammals | 96% | 76% | 76% | 72% | 72% | 44% | 18% |
| The Horse | 92% | 90% | 90% | 84% | 43% | 25% | 29% |
| Chocolate | 92% | 77% | 71% | 67% | 44% | 27% | 21% |
| Weaving a Revolution | 63% | 75% | 59% | 71% | 20% | 2% | 5% |

## Discussion

In this section we will talk about observations that stood out to us, and topics that were referenced earlier in this report.

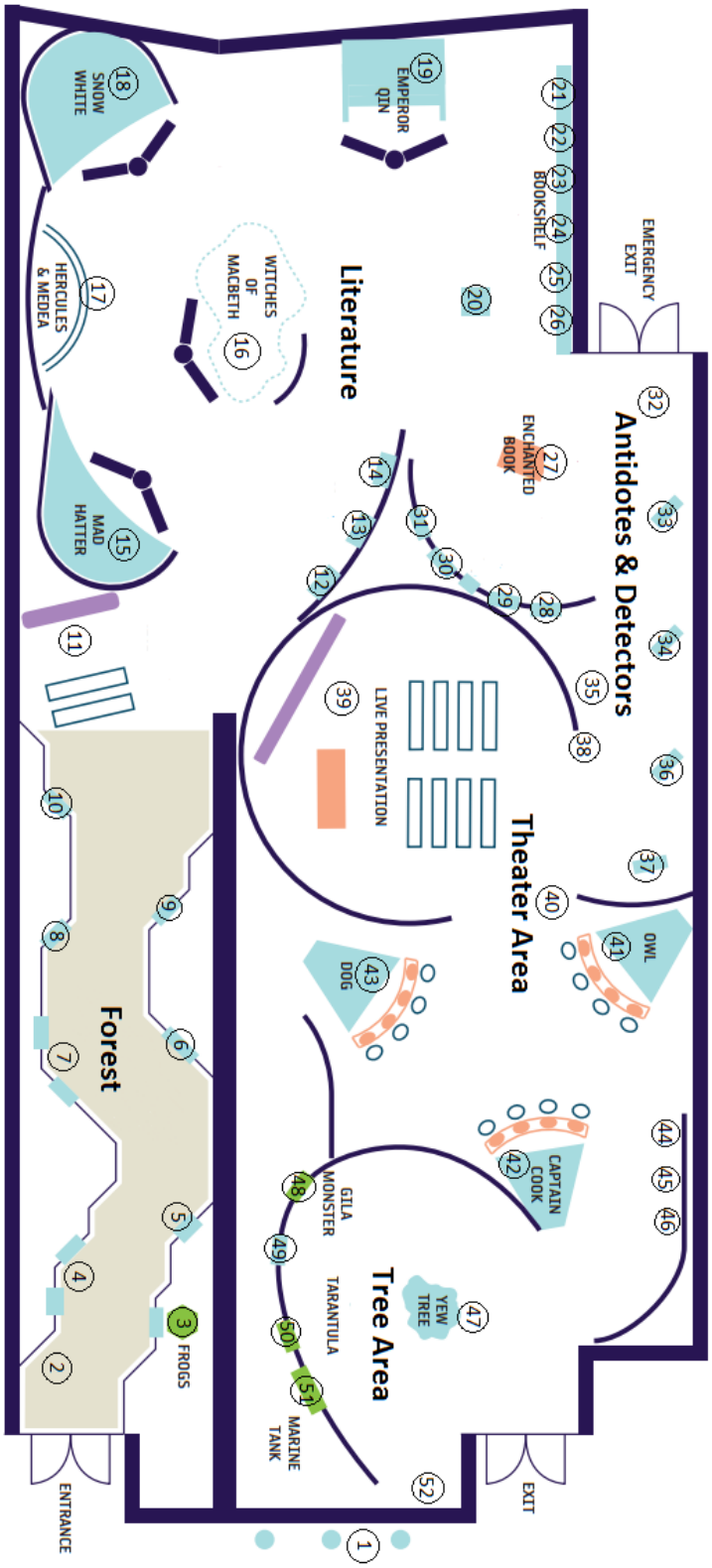
The longest stay visitor stayed 105 minutes and could be considered an outlier. Other than his extended time, his visit was typical. Removing his time when calculating total average stay time for the exhibition brings the averaged from 25 minutes down to 23. This 2 minutes is not a significant difference, yet it changes the exhibition's sweep rate to over 300 (indicating that it was less well used per Serrell's metrics on page 12) and changes it place on the list of exhibitions with the longest stay time from first to second.

Of concern to exhibition designers may be the placement of the sign announcing the time for live performances in the Poison Lab Theater (element #39). Data collectors noted in the tracking and timing sample, and noticed during cued interview collection, that many visitors (both study subjects and not) would look at element #1, in the approach to the entrance, and then see the sign, sometimes check the time, and then walk away. It was our impression that they perceived the sign to be the times the exhibition was open.

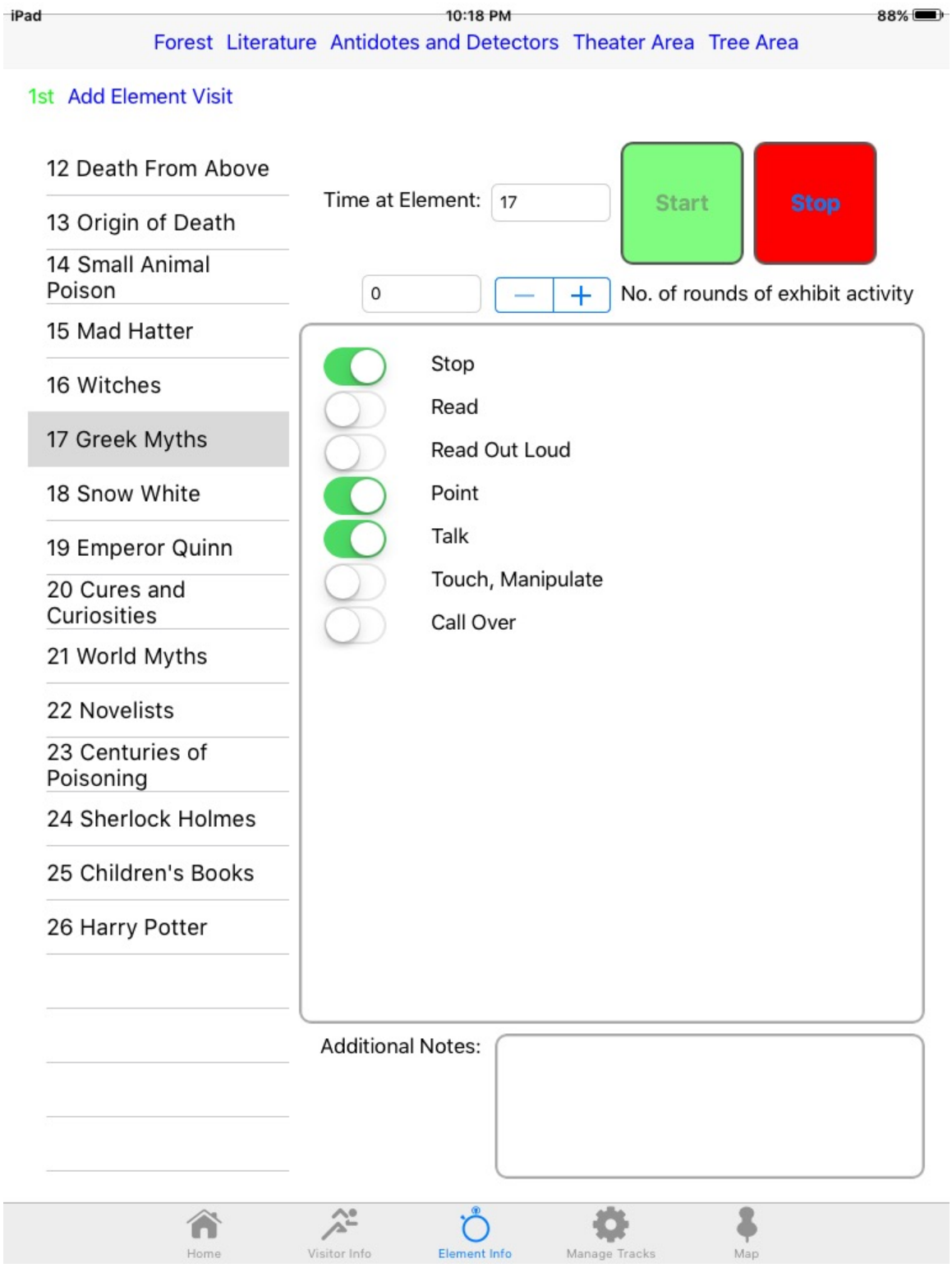
The Poison Lab Theater element was unique among exhibitions that have been displayed in this space. In this exhibition, a recorded video was projected, but at select times, a live performer presented the material identical to the video content. In data collection we did not consistently note whether the visitor watched the video or saw a live performance. The impact of the live performance thus cannot be accurately reported. In future studies this difference should be considered and consistently recorded.

Finally, freestanding text banners were at the bottom of two measurements: the least visited elements, and the shortest element stay times. This is consistent with heat map patterns noted by Serrell. She notes that findings across many studies show that intro labels have consistently low attraction rates. The banners in this finding could be considered the intro labels to each section of the exhibition, and are thus consistent with Serrell's findings.

## Appendix 1: Exhibition Floor Map of *The Power of Poison*



## Appendix 2: TrackNTime App Screen Shot



## Appendix 3: Cued Questionnaire Data Sheet

### Cued Exit Questionnaire for *Power of Poison*

Date _____ Time _____ Sheet# _____

| Sex: M F | Age: | # in Group | A Only |
|---|---|---|---|
| | <20 | 1 | A + K |
| | 20s | 2 | |
| | 30s | 3 | |
| | 40s | 4 | |
| | 50s | 5 | |
| | 60 + | 6 | |

Is this your first visit to the Natural History Museum of Utah?
Yes No

- How often do you visit?

Are you a member? Yes No
Do you have any special interest, knowledge or training in poisons and venom found in nature or described by literature? Yes No

1. *What would you say is the main purpose of the displays in these galleries?*

To show ...

_____

_____

To make people ...

_____

_____

2. *What is one new idea you are taking away with you?*

I didn't know, or I never realized that ...

_____

_____

and/or it reminded me that ...

_____

_____

Anything else? (use other side if necessary)

Data Collector