



## Summative Evaluation Report

compiled by  
Serrell & Associates  
Chicago, IL

for  
Museum of Ophthalmology  
San Francisco, CA  
and  
Redmond-Jones & Associates  
Berkeley, CA

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## *Animal Eyes* at Willamette Science & Technology Center

*A Summative Evaluation of the ASTC Traveling Exhibition in Eugene, Oregon*

### **Introduction**

This report summarizes the findings of an evaluation study of visitors' reactions to the exhibition *Animal Eyes* while it was at the Willamette Science & Technology Center (WISTEC) in Eugene, Oregon. The study consisted of two parts: unobtrusive tracking-and-timing observations and exit interviews. The results of the study at WISTEC are compared to the evaluation findings when the exhibition opened at its first site, the Lindsay Wildlife Museum, in Walnut Creek, California. (A separate evaluation report documents the Lindsay study, called *Animal Eyes* Remedial/Summative Evaluation Report, compiled by Serrell & Associates, Chicago, for Redmond-Jones & Associates, Berkeley, and the Museum of Ophthalmology, San Francisco, December 1998).

### **Exhibition Description**

*Animal Eyes* is a 2,000-square-foot exhibition consisting of 40 exhibit elements, including flat graphic panels and text, captioned models and artifacts, audio, and low-tech interactive exhibit units. Interactives include things to touch, lift and peek into. Elements demonstrate optic characteristics, such as night vision, field of view and 3-D vision. The target audience is children ages 11 to 14, but the exhibition is intended to appeal to an adult/family audience as well. The ambience is colorful and lively, with large photographs of the eyes of people and other animals. The label text is easy to read--legible and relatively short. Smaller, technical diagrams of eyes and vision systems offer a more abstract level of information.

The “big idea” for *Animal Eyes* is, “Even though we know how the type, number and position of animal eyes compare with ours, we are still on a quest to understand what animals actually see.” The exhibition is divided into sections that feature eye structures (“Different Kinds of Eyes”), color (“Seeing in Color”) and night vision (“Night Eyes”), eye locations (“Different Places on Different Faces”) and animals with more than two eyes (“3 Eyes, 5 Eyes, 8 Eyes, More”).

At WISTEC, *Animal Eyes* included three more elements than it had at the Lindsay Museum, and it was in a much smaller space with several unrelated exhibit elements adjacent to it (Mirror wall, Shadow space, Acoustic disk, and doors leading to the Geology collection and Kynex activity room). The layout of the exhibition was basically the same, but the way visitors approached it was slightly different. At the beginning of the exhibition, visitors encountered a small room (element #38) with posters about eye structures and a table where cow eye dissections were conducted, a table with the family guides (element #39) and a “telescope” (element #40). See Figure 1 for the floorplan.

Another important difference between installations was that at WISTEC no other major exhibits competed for visitors’ attention. At the Lindsay, live-animal exhibits (often the most attractive and popular exhibits in any museum) were located nearby. A notable similarity was that both the Lindsay and WISTEC fit the profile of the smaller “destination” museum: Visitors typically travel to such an institution by car, and the museum is the only site they take in. By comparison, museums in larger cities often are situated in clusters of attractions that offer multiple informal leisure-time activities.

## **Evaluation Methods at WISTEC**

Data collectors (museum studies students from the University of Oregon, Eugene) recorded observations of visitor behavior and interviewed visitors in *Animal Eyes* according to the protocols in Paying Attention: Visitors and Museum Exhibitions (Serrell 1998). (See tracking data sheet in Appendix A.) The techniques were modified to meet the context and logistics of WISTEC. Due to the small space and relatively low visitation rates on some days, data collectors were instructed to observe and interview the same visitors. Usually, separate samples of visitors are tracked and interviewed.

Data collectors recorded the time spent and stops made by a sample of 40 casual visitors. Half of the visitors were children 10 to 15 years old, and half were adults. Gender ratio was 53% female, 47% male. This was the same size and type of audience for the study at the Lindsay, but at the Lindsay, trackings were done unobtrusively, and visitors who were sampled for the observations were different than those recruited for the interviews.

Visitors were recruited with this statement as they entered the museum exhibit area:

“Hi. We’re watching and talking with people today about *Animal Eyes*. Would you mind if I watch you as you visit the exhibits and interview you after you’ve looked at the exhibits? You can spend as long as you like in the exhibition. The questions will take about three to five minutes.” A small gift was offered as a thank you, and there were only two refusals. Data collectors then watched visitors as they used the exhibits, and when they were done, the interview was conducted.

Findings from the trackings

Visitors in the WISTEC study sample used *Animal Eyes* very thoroughly. They stayed a long time and stopped at many elements. The average time spent in the whole exhibition by the sample of tracked visitors was 40 minutes. The shortest time spent was 15 minutes; the longest was 87 minutes. There was no significant difference in average time spent by children vs. adults. A frequency distribution of visitors' total time spent (see Figure 2) showed a bell-shaped curve; both mean and median were 40 minutes. (See Discussion below for comparisons between Lindsay and WISTEC data.)

On average, visitors to *Animal Eyes* stopped at 23 (or 57.5%) of the 40 exhibit elements. The lowest number of stops made by a visitor was 12, the highest was 37. A frequency distribution of the number of visitors' stops at elements (see Figure 3) showed a bell-shaped curve; the mode, mean and median all were 23 stops. A scattergram (see Figure 4) shows a positive correlation of visitors' total times and the percentage of stops they made.

A high percentage of the exhibit elements attracted high numbers of visitors. Twenty-two of the 40 elements (55%) were stopped at by more than half the visitors (21 or more of the 40 visitors tracked). The most popular elements were: chameleon, whale, worm Wentzscope, owl and pupil. The least popular elements were the text-only title and introduction panels and other graphics/text-only panels. See Figure 5 for a chart of the relative popularity of all elements. The most and least popular elements were similar at Lindsay and WISTEC (that is, roughly 75% of the same exhibits were in the top and bottom half of the rankings for popularity).

Almost all (97%) of the visitors were observed reading labels, and a full 90% of the visitors read at least one label out loud, a behavior associated with learning in exhibitions (Borun 1998). By comparison, at Lindsay, 50% of the visitors read aloud--and that was considered high. At WISTEC it was the highest ever seen.

The *Animal Eyes* Family Guide, new at this site, was used by 9 of the 40 visitors. Details of how it was used were not systematically recorded, but data collectors noticed that some visitors used it as intended--reading questions, looking at exhibits and discussing the answers as a family group.

#### Findings from the Cued Exit Interview (Open-ended Questions)

Exhibit developers wanted to know what visitors learned from *Animal Eyes* and if they understood the exhibition's main messages. The 40 visitors who were tracked also were interviewed. Data collectors read the questions to the visitors and transcribed their verbal answers. Questions included: What would you say is the main purpose of the displays in this room? What is one new idea you are taking away with you? Did these *Animal Eyes* exhibits remind you of anything? (See the questionnaire form, Figure 6.) Data collectors noted the gender, age, group size (number of people in the group, including the person who was the target sample) and group type (groups with children or groups of adults only). Visitors were asked if it was their first visit to WISTEC, if they came specifically to see *Animal Eyes*, and if yes, how did they hear about it. We also asked if people had "any special interest, knowledge, or training in eyes."

Findings from visitors' feedback on the questionnaire included the following:

- 80% of all visitors answered the "main purpose" question with an answer that related to animal eyes--from the simple "to show about animal eyes" or "to

understand how animals see,” to the more detailed “to learn about different types of eyes and how they work” or “the ways animals see compared to us.” When prompted by the interviewer, 90% of the visitors answered with similar statements. A few people made very general comments (“to educate”) or didn’t know.

- In response to the question, “What is one new idea you are taking away?” everyone offered at least one new idea, and one-third of them mentioned more than one. Most of their comments were very specific, relating to peripheral vision (11 mentions), structures and functions of animals’ eyes (10 mentions), color vision (7 mentions), and the number of eyes animals have (5 mentions).

*I learned that the woodcock can see an entire stadium.*

*I didn’t realize that at first sight when I look at you you’re upside down.*

*The world’s upside down and then in a fraction, milosecond my brain receives a signal to turn it around.*

*I never realized how many different types of seeing there are.*

*I always think two eyes when some even have hundreds.*

*I never knew snails had eyes on the ends of their little thingys or that clams could see.*

- Specific animals mentioned were: scallop, lizard / iguana / chameleon, clam, dog, whale, sea star, bee, fly, grasshopper, lion, snail, squirrel, worm, woodcock and owl. A transcription of all of the visitors’ feedback is in the Appendix.

• In response to the question, “Did the Animal Eyes exhibits remind you of anything?” many visitors (37.5%, or 15 of 40) said no. Twenty-two percent said they were reminded of school, and five people said “my dog.” A few people mentioned other museum trips, and several answered the question with a compliment. Additional compliments came in response to the last question, “Anything else?”

*I liked it a lot!*

*It reminded me of going to an art museum but this time it was more interactive. No “do not touch” signs. It was not just a visual experience. It was more interactive.*

*Pretty good, good for a lot of different ages. I mean she [referring to her granddaughter] is only three and she did not get bored. There were things she could touch and interact with.*

Some visitors offered suggestions, questions, or criticisms:

*It would have been nice if there was some sort of foot path for the kids to follow so they know where to go next. I also think there should be an interactive video and more multimedia.*

*Bring it down to a younger group or at least have a section where they could learn also. Two-to-four is too young for this exhibit.*

*One thing I did not understand was the whale. I felt like we needed more information. So do whales get hit by boats or do they move their heads a lot?*

And some visitors wanted one of the things specifically avoided in this exhibition:

*If they could make more of the binocular things more things you could look into-- how bugs could see or compound eyes.*

*I thought it would be more like seeing the way animals see. So I think it would have been neat to have more lenses you could look through that would be like the animals see.*

Of the total sample of 40 visitors, 65% of the people (26 of 40) had come to the museum especially to see *Animal Eyes*. Most of them had heard about it through the article in the newspaper; others had heard about it from a relative or friend. It was the first visit to WISTEC for 32.5% of the sample, and 27.5% of them had “a special interest” in eyes. Examples of special interests were “wears glasses,” “studied them in school,” “just curious” and “retired ophthalmologist.”

## **Discussion**

The purpose of the evaluation was twofold: to measure evidence of the exhibition’s effectiveness in engaging the public’s attention and communicating the exhibition’s messages at WISTEC, and to compare these findings with the evaluation done at the Lindsay Wildlife Museum. See Figure 7.

All the tracked visitors at WISTEC were cued visitors, and as such, their behaviors might have been altered from “uncued” visitors (i.e., visitors observed unobtrusively). While we expected that the WISTEC cued visitors might be more attentive (because they were cued), we were not prepared for the enormous

increase in time spent and exhibit stops. The average time spent by tracked visitors at Lindsay was 11 minutes; at WISTEC it was 40 minutes. Cuing usually increases average time, sometimes significantly, but it never doubles or triples it. We suspect other variables were introduced by the site characteristics (including the visitors themselves, WISTEC, and the cultural environment of Eugene). More WISTEC visitors came to the science center specifically to see *Animal Eyes*, (65%), and there were more repeat (not first-time) visitors among the WISTEC sample. This might indicate a more “intentional” group, compared to Lindsay, where there were more first-time visitors, and only 14% came specifically to see the exhibition. The proportion of visitors claiming a “special interest in eyes” was roughly the same (23% at Lindsay, 27.5% at WISTEC). Coming specifically to see it indicates higher motivations or expectations; staying a long time is evidence of engagement, diligence (for whatever reason) and, we hope, satisfaction (expectations fulfilled).

Given the size of the exhibition (2000 square feet), the visitors’ “sweep rate index” (square footage divided by average time) was 50 square feet per minute. Sweep rates of less than 300 square feet per minute indicate that visitors are usually moving slowly, stopping often, or spending more than a few seconds at each stop. At the Lindsay, the sweep rate was 187. Sweep rates of less than 200 are not very common among science exhibitions.

The percentage of visitors who stopped at more than half of the elements (“percentage of diligent visitors,” or %DV) was 73%. At the Lindsay, it was 45%, above average for many science museums. Visitors to the Lindsay used the exhibition fairly thoroughly, and at WISTEC, they used it exceptionally thoroughly.

The evaluation data showed other interesting similarities and differences between the two sites:

- Many of the same exhibit elements were most and least popular. “Field of View” again was memorable to many children and adults. The title, credits, some of the section introductions and the eagle panel were still the least attractive.
- The scallop exhibit was unusually popular and memorable at WISTEC.
- Visitors at both sites thought the main messages of the exhibition were about the numbers, structures, and types of animal eyes compared to humans.
- Even more visitors read labels and read them outloud at WISTEC.
- The chameleon exhibit, with its revised handle grips, still inspired some visitors to use it inappropriately (aggressive shoving), but not as frequently as was noticed before.

At the Lindsay, we speculated that if visitors had been enticed to stop a little more often in *Animal Eyes*, the exhibition’s tracking-and-timing data would rank it among the “exceptionally thoroughly used exhibitions,” that is, those with an SRI of less than 300 and greater than 51%DV. This turned out to be true at WISTEC. Was that because people who live in Eugene like to spend more time at museums than “normal,” or were they inspired by the exhibits themselves? One visitor commented:

*This is a small museum and I thought we would be out of here in 10 to 15 minutes. Instead I have had a fun afternoon with my grandchildren and they understand more of what I did and why. [She was the retired ophthalmologist] I liked it.*

These evaluation findings indicate strongly that *Animal Eyes* is an attractive, engaging exhibition that effectively conveys many of its main messages. In April, 1999, the American Association of Museums Exhibition Award Committee concurred, awarding *Animal Eyes* a first prize for excellence.

Special thanks to data collectors Deborah Carl and Erin Fahrenkrog

### **References**

Borun, Minda, et. al. 1998. *Family Learning in Museums: The PISEC Perspective*. Philadelphia/Camden Informal Science Education Collaborative, The Franklin Institute, Philadelphia, Pa.

Serrell, Beverly. 1998. *Paying Attention: Visitors and Museum Exhibitions*. American Association of Museums, Washington, D.C.

Transcripts of Summative Cued Exit Interview for *Animal Eyes* at WISTEC (1999)

**What would you say is the main purpose of the displays in this room?**

1. "what's inside eyes"
2. learn about the eyes and how they work
4. how animals see
5. "to learn the colors animals see and how they see"
6. to teach people about differences in how people see and animals see
7. to have something fun to do with children, to have a fun experience, to learn about eyes for kids 6 and up
9. to teach you about eyes so you will know if you have any questions about how animals see
10. to teach people about animals' ways of seeing
12. to teach viewers about differences in ways animals see things
14. teach about eyes
15. to see, how animals see
17. For us to learn how animals see. To learn about vision in general.
18. to show how different types of light work with eyeballs
20. maybe to show how different animals' ways of seeing things are?
21. "to learn about animal eyes"
22. to teach people about animal eyes
23. "probably to learn more about eyes"
24. to teach people about animals ways of seeing things
25. "to learn about eyes"
27. "to teach you about animal eyes and the comparison between different animal's eye sight"

28. Education on animal eyes
29. to teach people about eyes
30. to show people different animals see different things
31. "on vision and to teach you about eyes and how people and animals see"
32. to show people about eyes
33. to see which animals see in color and how many eyes different animals have
34. to make people better understand ways of seeing
35. to learn about animal eyes
36. animal eyes, about animal eyes
37. "to teach people about how animals see"
39. to educate children about how animals see, to learn about vision
40. to teach about animal eyes

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26. to teach about animals
3. "to educate children in general to get them away from using their nintendos to educate them"
8. education
11. educational for children, although adults can learn a lot also
13. to educate, gets kids excited about science and biology
38. education
19. "I don't know, about eyeballs, dogs and stuff."
16. (shrug shoulders)

**To make people. . ./To show people. . .**

1. "show people about different eyes"

3. "how different animals perceive" "how vision is appropriate to them"
5. "To show people how many eyes different animals have and understand reflection of animals eyes"
6. to show people we don't all see the same?
7. how animals see, how many eyes they have, different quality of animal eyes
10. to show people how many eyes animals have or how different other animals see
11. understanding animals and how they see in different ways, night vision
12. To make people realize how they see and that it is different from many animals
13. all the different ways animals see things
15. how animals see- how they compare to human eyes
16. To show people how different animals see
17. To show people, for example, bees can see ultraviolet light and we can't. It raises question "what if" we could see like that.
19. "To show and understand about eyeballs more"
21. "to show people that animals eyes are pretty cool, that they are interesting"
22. To show how animals see
23. "like about eyes and stuff and actually learning is fun"
24. to make people better understand difference in seeing
25. "to show about animal eyes- because people probably know about people's eyes but not so many people know about animal eyes and how they work."
26. To show people how animals see
27. "To help people understand, to show how animal eyes work"
28. To make. . .help people understand how animals see
29. how animal eyes are different than humans
31. "to show people how animals see"

32. To make people think about how animals see in different ways
33. to show people about animal eyes
34. to make people better understand ways of seeing
35. "to show people that there is a lot of differences I mean that animals see in different ways and there are a lot of interesting things about animals and the way they see."
36. to show people all the different types of animal eyes
38. about animals eyes in general
39. to show people that animals have different ways of seeing, for example some see in color, some have more than two eyes, etc.
40. to show people animals' eyes

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8. see biodiversity
9. "I knew most of this because I read a lot but there was also a lot I did not know"
14. "I don't know"
37. "to show kids and families that you can have fun teaching"

**What is one new idea you are walking away with you?**

1. "what animals can see in back of them;  
animals see in different ways"
2. eye in the middle of a head of a lizard- never knew any animal had an eye in the middle of their head
3. "scallops have cupped eyes and that their vision is so simple"
4. sea stars have eyes

5. names of animals

I learned that iguanas can see from each side of their head

6. I never realized how many different types of seeing there are.

I always think two eyes when some even have hundreds

7. what animals have reflector eyes;

that flies don't see a thousand different images,

that dogs cannot see the difference between red and green

8. animals have a different # of eyes

9. "that grasshoppers have 6 eyes,

I didn't know owls are so freaky looking, they are 2 funny shape (their eyes)"

10. I didn't know anything about any of this, it's all new

11. "A bunch of things- the way the guy learned about scallops,

adaption of animals to their environment

I liked that they compared it to us (humans) it provided a starting ground,

I liked the 3D thing

and the thing that made my eyes dilate. I've never seen my eyes dilate like that before"

12. I never realized how some animals eyes are on the side of their head and this is related to reasons for survival like the lion and squirrel section.

13. I did not know my dog could not discern between the colors green and red.

14. [building blocks are cool],

I never realized worms had eyes

15. colors

and seeing in the dark

and reflections

16. I didn't know dogs could only see things through certain colors

17. I didn't realize that at first sight when I look at you you're upside down. The world's upside down and then in a fraction, milisecond my brain receives a signal to turn it around.

18. I studied a lot of eyes in biology class, so I remembered lots about cones and rods.

19. "I didn't know animals had different numbers of eyes"

20. That I can see my arms even when they are this [showed me] far apart, also that whales would bump into boats if they weren't careful

21. "that whales have eyes on the side of their head"

[sister said:] "that spiders' eyes have different shapes"

22. I didn't know scallops had so many eyes

23. "that there are 6 million cones in your eye;

[I really like the shadow room],

I learned about a lot of things like lots of animals have reflectors in their eyes"

24. "I didn't know most of the things here, I always think of animals seeing whatever I see, I think, I learned a lot and isn't this for kids? I mean, written for kids to understand?"

25. "that cats can see color"

26. I never knew snails had eyes on the ends of their little thingys or that clams could see

27. "I learned that whales don't see straight, just on the sides"

28. I never realized how different every animals sees- even us.

29. how animals eyes are different than humans

30. I didn't know how chameleons eyes rotate around the way they do- or that worms have eyes

31. To show people how animals see

32. Everything!

33. I learned that a dog can see only blue and yellow,  
I learned that the woodcock can see an entire stadium
34. there are ways of presenting information that makes learning easier and fun.  
I know a lot about eyes and my grandchildren do too now.
35. "I didn't know dogs can't tell the difference between red and green"
36. I think it's amazing how different the human way of seeing and registering  
what the eye is seeing is from animals
37. "that scallops have eyes"
38. About animals eyes in general
39. I learned that scallops have eyes
40. I didn't know certain animals eyes reflect light

**Did the Animals Eyes exhibits remind you of anything? (no number= "no")**

2. high school biology
3. "No, I thought it was a great exhibit"
5. no, I would like to come back again
6. biology class
7. no, just that it's a good interactive exhibit
9. "Of a book series called Animorphs"
10. Hmmmm, there are a lot of animals out there
11. "class trips when I was s little girl"
12. how I learned in school about people and how they see
13. other science museum exhibits
15. elementary school
16. not really but I liked it.

17. It reminded me of going to an art museum but this time it was more interactive. No “do not touch” signs. It was not just a visual experience. It was more interactive.
18. Biology class
19. “Yes, when I had fun with my friends the last time we came here”
22. They reminded me of how different animals are from people.
23. “Yes, I always have fun here”
24. not really, like I said before, it was all mostly new to me- except that dogs are color blind, I learned that at summer camp one year
27. “the dog reminded me of my dog and the raccoon of my last name ‘coon”
28. My dog when I was growing up went blind, we also had a kid in our neighborhood who would cut whiskers off cats and they would walk into walls- there wasn’t anything on how whiskers help some animals see- or guide them
30. That my dog and cat don’t see the same as each other or me.
34. my job and studying back in school
36. I was excited because we have never talked about stuff like this in school. I like it.
38. science class when I was in high school, I heard about the cows eye dissection and we may come back for it, brings back memories
40. My dog from my old house, he couldn’t see very good maybe he wasn’t able to see colors.

**Anything else?** (missing numbers said “no”)

2. a lot of fun
3. I would share w/ people the way whales see boats

5. "I learned how animals have different numbers of cells, like octopus 1, butterfly 4, pigeon 2, person has 3, color sensitive cells"
7. pretty good, good for a lot of different ages. I mean she (referring to her granddaughter) is only three and she did not get bored. There were things she could touch and interact with.
9. If they could make more of the binocular things more things you could look into- how bug could see or compound eyes
10. I liked it a lot!
11. "A lot of interesting facts to pick up, one thing I did not understand was the whale. I felt like we needed more information. So do whales get hit by boats or do they move their heads a lot? I think they should provide that information. I thought it would be more like seeing the way animals see. So I think it would have been neat to have more lenses you could look through that would be like the animals see"
12. not really, I enjoyed myself and so did Mom
13. It would have been nice if there was some sort of foot path for the kids to follow so they know where to go next, I also think an interactive video and more multimedia.
14. I think it's pretty cool.
15. Bring it down to a younger group or at least have a section where they could learn also. Two-four is too young for this exhibit.
17. It was a great exhibit. I would just encourage them to come up with new, similar ideas.
18. Nice exhibits even for someone with a little kid. We go to OMSI in Portland all the time and there aren't always things for all ages so this is nice.
21. "Yes, that it is a really cool exhibit"
22. I liked it

23. "It's very cool"

25. I think there should be less words and more to do

26. We had a nice time

27. "I think that it should have more hands-on things, more buttons like body kinesthetic stuff"

28. We are meeting people or we would have stayed longer- now we have a reason to come back

29. "It's really good, but more hands on- on things especially for kids. I think there was a lot of text; adults are more into that"

33. no, I just like learning about animals

34. This is a small museum and I thought we would be out of here in 10-15 minutes, instead I have had a fun afternoon with my grandchildren and they understand more of what I did and why. [She was the retired ophthalmologist] I liked it- fun.

37. "I thought it was very interactive and great for my older kids"

38. nice graphics, easy for children

39. I thought it was very interactive and I learned a lot. Some of it was difficult for my younger grandchild but I think she still had fun.

40. I really like this museum but this [pointing to exhibit] is the best!