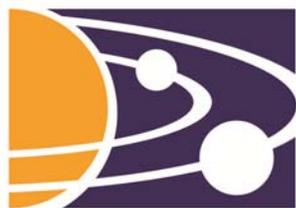


STAR_NET Front-End Evaluation Report May 14, 2011

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Background

NCIL was awarded a grant from the National Science Foundation to support the *STAR Library Education Network: a hands-on learning program for libraries and their communities*, (STAR_Net for short). STAR stands for “Science-Technology, Activities and Resources.” The overarching goal of the project is to reach underserved youth and their families with informal STEM learning experiences.

Team members include NCIL staff, the American Library Association (ALA), Lunar and Planetary Institute (LPI), and the National Girls Collaborative Project (NGCP). STAR_Net will develop two important education and exhibit programs: *Discover Earth* and *Discover Tech*. These exhibit programs will serve eighteen libraries across the U.S. over a two-year period beginning in 2011.

This report is the result of patron interviews regarding STAR_Net topics in three libraries in Virginia and Texas.

Evaluation Questions

In this front-end work, we endeavored to gain feedback regarding the following questions:

1. How often and in what ways do patrons use the library?
2. What is the patron level of interest in science and engineering?
3. What comes to mind for patrons when thinking about the environment?
4. What do individuals know about the difference between weather and climate?
5. What do individuals know about their local natural history?
6. Do patrons understand the concept of Earth Systems Science?
7. How connected do patrons feel their local environment is to other environments?
8. What is patron opinion about the proposed Discover exhibition titles?
9. Are patrons likely to participate in an exhibition photo wall?

Key Findings

- Patrons to these libraries visit frequently, far more frequently than one might visit a museum. Many of those interviewed come to the library on at least a weekly basis.
- Nearly half see themselves as highly interested in science (rating themselves a 6 or 7) but engineering rated much lower. Only 12% see themselves as highly interested in engineering.
- Individuals immediately thought of conservation, global warming and pollution when asked about the environment. Several characterized themselves as ‘doing their part for the environment’; the environmental behavior cited was recycling and rarely anything more extensive.

- Patrons generally knew there was a difference between climate and weather, and much of them could describe that climate was a long-term status, whereas weather was more immediate.
- Individuals were not confident in their knowledge of their local natural history. They were able to make some references to local geology, history and the built environment. Several pointed out that they were not natives, and therefore had less understanding.
- There was little to no understanding of the term “Earth Systems Science”.
- Individuals felt that their environment had changed extensively in the last hundred years and could give examples of development and pollution.
- Individuals did feel that the local environments were interconnected, with two-thirds rating areas as being totally or almost totally connected.
- ‘Discover Earth: A Century of Change’ was the top title choice for the Discover Earth exhibit.
- ‘Discover Tech: Engineers make a world of difference’ was the top title choice for the Discover Tech exhibit.
- Patrons were tentatively interested in the concept of a photo wall. As over 50% felt they would likely not contribute, the implementation of the photo wall should be planned to take into account strategies to generate success when a minimum of individuals take part.

Methods

The data was collected through face-to-face interviews at three branch libraries on February 25th and 26th, 2010. Individuals were approached by either the interviewer or librarians and asked to participate in a short interview. If they agreed, they were taken to a place to sit down nearby. Once the interview process was completed, another individual was recruited, attempting to achieve population sampling.

Sample

A total of 44 interviews were conducted, 16 at Blanco Library in Texas and 28 at 2 branches in Roanoke Virginia. These sites were chosen to gain feedback from diverse audiences in typically underserved areas. All interviews were adults over age 18; no specific ages were noted. The majority of the interviewees were female (64%, n=28); males accounted for the remaining 26% (n=16). Respondents were ethnically diverse; 32% of the population was African-American, and nearly 10% were Hispanic or Latino.

Table 1: Race/Ethnicity of Respondents

| Race/Ethnicity | Percentage | N |
|----------------------|-------------|-----------|
| African-American | 32% | 14 |
| Asian-American | 2% | 1 |
| French-Indian | 2% | 1 |
| Hispanic/Latino | 9% | 4 |
| Multiple Ethnicities | 5% | 2 |
| White | 50% | 22 |
| Total | 100% | 44 |

Findings

Use of Library

Respondents were asked to how often they visit that particular library. The majority of respondents came to the library at least weekly (27%) with 44% at the library several times a week. Respondents were also asked if they visit other branches besides the one they were currently in. Nearly three-quarters (73%) stated they also went to other branches.

Table 2: How often do you visit this library?

| Race/Ethnicity | Percentage | N |
|-------------------------|-------------|-----------|
| Several times per week | 44% | 18 |
| Weekly | 27% | 12 |
| Monthly | 20% | 9 |
| Several times a year | 7% | 3 |
| Never/Not in many years | 5% | 2 |
| Total | 103% | 44 |

*Rounding accounts for more than 100%.

Interest in Science

Respondents rated their interest in science highly, with one-third (32%) stating that they were extremely interested in science. The spread was more significant than one might see in a science center however, with 29% marking themselves at 1, 2, or 3 on a 7-point scale.

Table 3: How would you rate your interest in science?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Extremely |
|------------|-------------------|-----|-----|-----|----|-----|------------------|
| Percentage | 7% | 11% | 11% | 18% | 7% | 14% | 32% |
| N | 3 | 5 | 5 | 8 | 3 | 6 | 14 |

N=44

Interest in Engineering

Respondents were less interested in engineering. While 12% noted that they were extremely interested, 23% were neither interested nor uninterested and more than one quarter (26%) stated they were not at all interested in engineering.

Table 4: How would you rate your interest in engineering?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Extremely |
|------------|-------------------|----|-----|-----|----|----|------------------|
| Percentage | 26% | 9% | 13% | 23% | 9% | 9% | 12% |
| N | 11 | 4 | 5 | 10 | 4 | 4 | 5 |

N=43

What comes to mind when you hear the word “environment”?

To gain a better perspective on how potential exhibit visitors would understand the Discover Earth and Discover Tech exhibits, early in the interview we asked visitors what came to mind when they heard the word ‘environment’. The question was asked in an open-ended format, and we gave very little to no cuing about what sort of answer we were expecting.

Responses fell into 4 categories. The largest category centered on conservation, pollution, and global warming. Most responses deal with human change to the environment and attributing climate change to human activities, with a few notable dissensions. A much smaller number of individuals answered in more descriptive terms, saying what came to mind was green, trees, cleanliness and air. A third group framed their response around setting, either their home (a ranch) or settings in general (being out in the woods). Finally, there was a group of more mixed responses, difficult to characterize. These responses reflected the multiple meanings of the word environment, such as the home environment, a restaurant environment, etc.

The full set of responses is listed below, by type of response:

Conservation/pollution/global warming

- Environment can be a bad word. People are a plague, we're killing the environment.
- That there's a lot of destruction going on.
- Health, that the environment should be cleaner, that more people should volunteer to clean the environment to make a better world for our children, grandchildren, etc.
- It's sad because of what we're all doing to it. It's not what it was 10 years ago.
- Green. I mean using products in your house that are biodegradable. Just making an environment for the future. We're ruining our environment
- Trees and grass and air. Pollution
- Fossils, the ozone layer. I hope it doesn't happen, that thing with the ozone layer.
- How everybody's going green, the clean atmosphere.
- The concern over the environment, and the confusion too. The concern is that we're causing harm to the environment. Confusion over there is really an issue, is the environment really in trouble. If so need to do something about it.

- The air, pollution, trash
- Deforestation, programs to keep the Chesapeake Bay clean
- The ecology, liking to see more clean, neat and organized Mother Earth. I recycle. I come from the Chapel Hill-Durham area. It's more of a proper program there. I'd like to see Roanoke more ready.
- I think of climate is what we have come to believe it is and I believe our climate has changed. The painting of Washington crossing the Delaware--that was the last time the river froze and now it froze again this year. We had a couple of 100 years of warm weather and now we are heading back to an ice age.
- Green- that's all I hear these days. I recycle and stuff.
- Keeping the environment clean, recycling not littering, pollution.
- Cleanliness, pollution
- Nature, to me Mother Nature overs a lot of things. Plants and vegetables and the food growth industry and your health. If we get too much rain the vegetables suffer. By the same token if we get a drought they suffer as well.
- Recycling, Green Ways
- Like the air we breathe, water, trash, stuff like that.
- Changes in the climate, can be dust, rain, air. It makes me think of my allergies

Atmospheric

- Green. Lush. Fresh. Water.
- Green, change, ecological change.
- Green
- Green, pleasant, colorful, warm
- Trees and grass and air. Pollution
- Plants, flowers, trees, pollution
- very nice, clean, never crowded. Good choices.
- Air, trees, the beauty of it I like.
- Being clean, cleanliness. That's what I think about.

My home/settings

- Where I live.
- What's around me.
- A ranch with horses, green pastures.
- A nice peaceful land, mostly ranches
- I'm an outsider. I like the garden. Bug watching.
- Everything. The world. Nature. Being out in the Woods
- It pretty nice and quiet where I am. I'm from New Jersey. There's not a lot of grass and trees. Living here it's a lot better for the tress and all the greenways. It's all concrete where I come from in Jersey.

- I compare it with the city of Salem. They are more cleaner about the roads, getting the salt out, it's just cleaner in Salem.
- Earth and the things that make Earth. Different settings. Areas.

Mixed meanings

- Ambience, light, temperature, warm colors, light colors, comfortable chairs--I think of my house and I'm thinking indoor environment. For outdoor environment I thin of good stewardship vs. losing all our freedoms. I can't remodel my house and I can't cut down a tree because some toad might be there. Balancing that with the responsibility to take care of what's been given to us. (But) on a hierarchy, (I think) humans rank higher than animals.
- Trees, air, outside. It could mean ambience, like in a restaurant.
- Outdoors, the better sitting than that. Arrangements out of the cold. (Difficult to understand.)
- I'm a natural resources management specialist. It's a loaded question, I don't know where to start.

Difference between Weather and Climate

One ‘big idea’ within the Discover Earth exhibit is the difference between weather and climate. We asked interviewees if they thought there was a difference between the two terms, and if they did think the two were different, if they could explain what the difference was.

Over three-quarters (84%) stated they thought there was a difference between weather and climate, with only 9% saying there was no difference between the terms.

Table 5: Do you think there is a difference between Weather and Climate?

| Race/Ethnicity | Percentage | N |
|------------------------------|------------|----|
| Yes | 84% | 37 |
| No | 9% | 4 |
| Did not make a choice | 7% | 3 |
| Total | 100% | 44 |

The majority of verbal responses regarding the difference focused on how climate is weather over time, less immediate and more about the overall trends. A smaller set of responses focused on the geographic element to the word climate, such as a desert climate versus a mountain climate. A third category of individuals focused on how climate is changing. Finally, one set of individuals pointed out that climate could have multiple meanings, such as the climate in a marriage or financial climate.

Full verbal responses to this question by category are as follows:

Climate is weather over time

- Weather is what's happening at the moment, like it's raining today. Climate is what's happening all the time; it's like the history of the weather.
- In winter we have cold, sometimes there is heat. The weather is the hour, the day. Climate is what is happening with the temperature.
- The weather is what you see outside. The climate is the weather over time.
- Climate is a 30 year average of the weather that's going on.
- Weather is an immediate changing of the temperature and precipitation. Climate is long-term, the semi-annual or annual overall weather
- Climate means general and the weather is minute by minute or daily or seasonal.
- Weather is what happens on a daily basis. Climate is what happens over a century. For example, in Sugarland, TX there used to grow sugarcane, but it's too cold now so it doesn't grow anymore.
- Weather is what happens and climate is what it is. Weather is a specific term and climate is a general term.
- Climate is going to be determined year-to-year, weather changes day to day or season to season. You have different types of climate, for example, tropical. But weather is unpredictable.
- Weather is the day-to-day changes in temperature and precipitation. Climate is the long term accumulation of weather.
- More commercially than practical. Weather is report, etc. Climate is something bigger.

Climates are in particular geographic areas

- Weather comes and goes every day. Climate is the overall environment that includes a whole group of animals, plants that are adapted for that area.
- Climate has to do with altitude, what part of the world you live in. Weather is like if it's hot or sunny. The weather here and in Colorado could be the same, but they're different climates.
- But I don't know the difference. Climate, as in more of a certain area, like it's dry in Arizona in the Desert. The weather is like if it's rain or snow.
- Weather is like today. Climate is having an effect in other places.
- Weather is what happens daily. Climate is a zone of the total Earth, divided at the Equator. It's an area.
- Weather is what you are experiencing at the time. Climate is what you're experiencing in a particular area
- Weather is rainy, snowy, sleet. Climate is what you live in, some climates are warm year round. Colorado, for instance, is cold.
- Weather is on a daily basis but climate is how warm or cold it is compared from one place to another.

- Weather is like windy, breezy, etc. Climate is where you are, as opposed to the climate in another state.
- Weather is more day-to-day, Climate is the trends over centuries.

The weather and/or climate is changing

- Cold and hot (laughs). This year we were really cold, more than we've had in 4 years. We had ice this year. And in the summer, it can go up to 3 digits (she means the temperature).
- Warmer all they way to December. Last week it was in the 70s, then the 30s. You can tell global warming is taking effect.

I don't know

- Weather could be like there's a storm. Climate...kind of stuck on that (he means he doesn't know).
- I know there is but I don't know what.
- The weather is like when it's going to rain, they know how to predict when it's going to rain. But I don't know what it has to do with climate.
- I'm not really sure. I don't have a grasp of the difference between the two
- It's about the same I guess. I couldn't really say.
- I don't know what the difference would be.
- I don't know the answer to that.
- I know the difference but it takes me a minute.

Other types of climates

- Weather could be the actions of the things that are outside. You can have climate inside--like climate control and it man made with humidifiers and A/C, heating units.
- They can be the same, but not always. Climate could be the room temperature, turmoil in a marriage or in a school setting. Weather is how cold it's going to be today or what the high temperature will be.
- Of course we need more rain. Weather is natural, can't do a thing about that. Climate is where you live, in terms of financial and other things.

Other

- Climate is higher than the regular flat surface. Weather is on the surface.
- Climate is controlled by the solar system. The weather is an offset of whatever is raised in that area.
- Weather is really cold compared to where I'm from. (Vietnam)
- Climate here in the summer is hot, humid and unbearable. I'm a very outside person but it's too hot here. Most people don't realize it gets cold here.

Natural History and the Local Area

One focal point for the Discover Earth exhibit and the accompanying programming and materials is the local natural history over time. We asked patrons how much they knew about natural history within their local area. Most were not confident of their knowledge of the local area, and this was reflected in both their ratings and in their verbal comments. Over 25% selected the lowest point on the 7-point scale to reflect their knowledge, and 71% rated themselves at the midpoint in the scale or lower.

Table 6: How much do you know about the natural history of your local area?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Extremely |
|------------|-------------------|----|-----|-----|----|----|------------------|
| Percentage | 26% | 9% | 13% | 23% | 9% | 9% | 12% |
| N | 10 | 6 | 8 | 5 | 7 | 5 | 2 |

N=43

When asked to describe their knowledge of the natural history of the local area, patron responses were fairly general and quite diverse. While there were responses related to the habitat, flora and fauna of the area, a nearly equal number of responses focused on the historical context of the area (such as Indian settlements) or the built environment (railways, etc.). Other categories of responses included how much the local area had changed, an agricultural focus, or a recreational focus. A significant number of the respondents noted that they were from elsewhere in the country and therefore did not know much about the local area.

Features of the habitat: Flora and Fauna

- I'm a genealogist and historian for the library, but I'm not working today. There are dinosaur tracks in the river, bat caves in the area, limestone in the river.
- I have a BS in wildlife management. I live on a ranch. I'm cognizant that what I do to the land affects wildlife and animals. There was a painter named Bishop Landa who travelled with Coronado in the 1560s and he painted pictures of cedars then. That's 400 years ago. What people don't know is that they're native to the area and so they think the cedars-which are actually junipers-are a scourge. But the animals would starve without the cedars, they eat the cedar berries. They stop the buffalo grass from growing so I can see the rocks on my land. They keep the earth cool with their shade. If you cut them, the grass grows back--the water the cedars suck up is sucked up by other plants that grow in their place.
- I understand the basic ecology-the broad stuff, a lot of how the land was historically.
- Big lakes and the mountains. We're on bedrock here. We are an agrarian state; we're trying to move towards technology. We have four seasons but our climate is mild relative to the rest of the country.

Historical context

- The Indians used to camp out here. The Germans established this town in the 1840s. This is a valley with a river in the middle. The Indians used to come here and camp in the winter; they'd declare a truce while they were here and then go back to wherever they were from and fight each other again.

- Don't know much about Blanco's natural history. There's several pony express relay stations in the area.
- Does this pertain to geological things? I know that this town is is a pathway that the Indians would go through. Of course, we're in a valley. Big lick is called that for the deer.
- History of the town, rail yard. Big Licks.
- I guess I'm thinking of the Native American tribes.
- Roanoke was based on salt licks and paths. They raised the rivers to transport trade items.
- I am part of a heritage family that came to Utopia, TX in 1870, that's up by Lost Maple State Park. The maples have been there forever but there aren't supposed to be any maples in that area, that's why it's called "Lost Maple."
- I know that the junipers everyone is trying to get rid of are native to the area. They're invasive but they've been controlled by wild fires up till now

Focus on the town

- I have 20 years of living here. This town focuses a lot on restoring and maintaining the environment. There's a club that goes around building parks and watering plants. Also, we are the capital of lavender. Everyone has their own farms where they grow lavender.
- I know when the Big Flood was, I know we had a big tornado that they came to find out where it came from, I know the school was built in 1966 and how cheap the acreage used to be here and what it costs now, now that people from California have discovered it.
- I know about how the railroad started and was run. About the historical buildings on First Street. That's what I know about.
- Well, Mountain and our parkway. Overall city of Roanoke is pretty clean.

Focus on agriculture

- This is a rural area, there is lots of agriculture, we have cattle, goats. We grew up on a ranch and my children worked in the fields. The plants grew, everything was planted: squash, beans, corn, peas, green beans, potatoes.

Focus on change

- I grew up on a ranch. There are too many houses now, people are selling their ranches and that can cause problems to the environment. Animals come in closer to people. I saw a cougar come in to town looking for food.
- That there was a wool factory down from me and that the river was clearer and that there was only 1 stoplight 11 years ago and that the population has grown.
- I've noticed a drastic drop in the school system over time.
- Big Lick. The dump they changed into the Addison School.

I don't know about here, I know about other places

- I've only been here 4 months. I know more about Arizona--the heat there is what started my problem with allergies.
- Haven't lived here that long, about four years.
- I spent most of my life in the military, moving around. But I know the Park in Booker T Washington. Blue Ridge Mountains. I walk through and look.
- I'm from Chicago, I'm a transplant. I do partake in the nature here. I'm an engineer.
- Depends on which environment. I grew up in the Maine, where we sent logs down the river. Thinking about the salmon and the impact on families in the change on business. There was a campaign to clean up so the factories don't dump into the river. When I lived in NY, people dumped there ashtrays in parking lots. This isn't rural here to me. Rural is fridges on porches. Here was have Smith Mountain Lake. I love it up there. That's a clean lake. They are very conscious of what they dump in the lake.
- I'm new to the area, I'm from Virginia Beach and Niagara Falls.
- I'm not from here. I like Museums, but not the ones in Roanoke. I'm thinking in DC they have more history for the kids.

Focus on recreation

- I hike the AT. That's where I do my hiking.
- We do a lot of hiking and things. At Natural Bridge and other spots.
- The forests, I love the forests and the mountains. If I were elsewhere, I'd say the ocean. I love the ocean, I love the water.

Change over last 100 years

One of the interpretative lenses for the Discover Earth exhibit is the change in the local environment over 100 years time. The majority of interviewees felt that the environment had changed over the last 100 years, yet individuals struggled with this concept, as 100 years was outside the scope of their lifetime.

Table 7: How much has the environment changed in your local area over the last 100 years?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Totally |
|------------|-------------------|----|----|-----|-----|-----|----------------|
| Percentage | 5% | 3% | 3% | 10% | 18% | 24% | 37% |
| N | 2 | 1 | 1 | 4 | 7 | 9 | 14 |

Responses fell into 5 categories, with a large degree of overlap. The largest category of responses focused on development and the impact of development on natural areas. One of the other categories of responses focused on pollution specifically, and a third category discussed changes in environmental actions, such as the creation of the EPA agency. Finally, a fourth category focused on technological change over the last 100 years, such as the existence of cell

phones. Finally, a fifth substantial category focused on climate change. (Please note that this question came after the questions about weather and climate with the interview.)

Six individuals did not make a choice, stating that they didn't have enough knowledge of the last 100 years to know. Some noted that they had only lived in the area for a few years.

Development & impact on natural areas

- I was raised in Houston (meaning he doesn't know about local area); we're cutting down all the trees. Houston is spreading out and cutting down everything.
- It's expanded a whole lot, lots of newer buildings, roads, all sorts of growth in this area.
- Just more asphalt and concrete, light and noise pollution, overgrowth of cedar trees-- they're awful, they suck up all the water and they're changing the landscape around here. When ranchers cut down the cedars they discover streams they didn't know they had.
- It's changed a whole lot. A lot of the forest areas are gone compared to when I was growing up. Where the truck stop is and all those development, that used to be forest. The more they take away, the more it effects the air.
- There is no natural change. If it's climate, I don't think it's changed that much. If it's civilization, then there has been change. For example, San Antonio used to be a dot on the map and now it has 4-lane highways. I don't think environment has changed that much but civilization has encroached on the wild areas a lot. There has been a population explosion--we're worse than the fire ants!
- it has changed a lot for the better in the last 20 years. There are lots of businesses and restaurants being built.
- A lot. The Mall. More businesses built. They cut a lot of trees done to build those stores and things. Gets me so mad. Should protect the forest more.
- Our population, we have more building, we have housing developments, subdivisions. In fact I was just in an area another day and it was all plowed up and I guess they are going to sell houses.
- I've heard a lot of different stories so I know it's changed a whole lot from when I used to visit. It used to be grass where the mall is now. There used to be more land, not it's more built up.
- In the past 25 years that I know of, it ha been a lot. Population is growing. It's not all raw land, there were cotton fields here.
- The urbanization of the area, interstates coming through, housing developments, wildlife encroachment or rather us encroaching on the wildlife in the suburbs
- It's changed a lot, especially when you go away and come back. Otherwise you don't see the change.
- Our existence and all the concrete and electricity.
- Not in the last seven years, since I've been here in Roanoke. Boston changed over time, more crowded, more crime, more traffic.

Pollution

- Cities are getting bigger, pollution seems to have gotten a bit more, people try to pick up trash but there are still a lot of people that don't care. People tolerate little things in their environment but over time, those things get bigger. But it's so gradual that people don't notice. People from 100 years ago would be surprised by how much it has changed here. When it rains now there is that nasty foam in the river that's not very appealing.
- Impossible to answer. I haven't been living in any place for very long...but perhaps it hasn't changed because of what's happening in the atmosphere, in the ozone layer.
- I've only been here 10 years. There's more traffic so there's more pollution, more smog, fewer trees.
- Tremendous impact. Even when I was a child, the environment was cleaner, had a lot more to see, more adventurous. We seems to be healthier. Even though medicine has improved, it seemed like we were healthier because we had access to the environment.
- My grandfather had the park to take care of and now it takes lots of people to do that. People throw trash in it and I just have to stop and pick it up.

Environmental Action

- I'm a 50s product. The EPA wasn't even in existence. I've lived through bad air and litter. That's changed for the better. I feel it's due to the EPA. I'm a huge recycler. I was doing it before the city was. I was trying to get my neighbors to do it.
- There's things that you used to do, like changing oil and antifreeze, back in the 80s and 90s, not you can't change your Freon. Now you can't change your Freon because of the environment.
- I've seen a big change in just the 6 years I've been here. In the greenways and what they are doing with the recycling.
- Hybrid cars, the pollution is not what it used to be.

Technology Change

- More vehicles, cell phones, TVs, satellites, more towns. Some things change and some things stay the same, like the ranches.
- We have computers and man has gone to the moon. Children today know more than we do.

Weather change/Climate change

- If you are asking about global warming, then definitely. The winters are warmer and the summers are hotter. I grew up right here in this neighborhood, all my life.
- All the stuff by Vice President Gore is a bunch of hogwash. Maybe there's a small little bit of truth but they talk about global warming and we've had one of the coldest winters since I was a child.
- Like everywhere else it's slightly warmer now with more extreme temperatures.

- I've heard the weather has changed here a lot in the last few decades. The summer are hotter, more humid, in the winters there is less snow.
- In temperatures and in winters. Except for the last 2 years it was warmer. A whole lot more development and more people.
- Humans do have an effect on the environment. We create our own ecosystem: I dug a well to get water for my plants; those plants attracted insects; the insects attracted lizards; the lizards attracted bobcats. But people are saying we are responsible for climate change and that's why the Earth is getting hotter. But humans do not affect climate. Sun spots are making the Earth warmer and Mars hotter, so how can we be responsible for climate change on Mars?
- I've only been here 6 years so I'll talk about West VA and there the rivers have changed and we had a 100 year flood.
- There is no natural change. If it's climate, I don't think it's changed that much. If it's civilization, then there has been change. For example, San Antonio used to be a dot on the map and now it has 4-lane highways. I don't think environment has changed that much but civilization has encroached on the wild areas a lot. There has been a population explosion--we're worse than the fire ants!
- it has changed a lot for the better in the last 20 years. There are lots of businesses and restaurants being built.
- From what I see, it's on a cycle. I think it's about a 10-year cycle. Like 10 years ago, it was colder and we had some snow (here in Texas) and then we didn't have any snow. But now we're starting to have snow again. It may have to do with El Nino o Nina, but I see it coming back.
- I've only been here 30 years so don't really know. Its gotten hotter here the last 15 years. My garden used to do so much better in the summer, but now, it's not so I have to adapt: I make it so that there's shade, I plant different things that will grow.

People have changed

- It used to be a stable environment. We had less technology and fewer people. We could count on the weather changing at certain times. As we become more technology and less service orienting. Downtown is changing at a significant rate, we spread out more and more.
- Less people now. People's morals are not the same. Less courteous. Just different I guess.
- Not in a good way. I helped put up the Museum (construction) but they are already having problems. Not making the money they thought they'd be making. This is not a commonwealth state anymore, it's more geared for retirement folks. Not much for the young people to do.
- The people. A lot of people died and are incarcerated. They are beginning to do a lot of makeovers but still a lot needs to be done for the children.

Understanding of Earth Systems

As the overall Discover Earth exhibit is about Earth Systems Science content matter, we queried patrons about their familiarity with the term Earth Systems, and what it might mean to them. Two-thirds of the respondents had not heard the term before and did not know what it referred to. Some of those who had not heard the term before were somewhat correct in deducing the subject matter, referring to Earth processes and linked systems, such as geological processes. Another set of individuals thought the term might have something to do with the solar system.

I don't know

- I don't even know what Earth Systems is.
- Nothing, I haven't heard the term before.
- I don't know how you define that.
- Don't know--haven't heard the term before.
- Needs some more definition, I don't know.
- I don't know, never thought of it.
- I haven't heard the term. Systems that are on earth, like man going to the moon, things that happen/develop here on earth. The wonderful changes we have had, how we have progressed in medicine and in chemistry, conquering illnesses. Earth systems are improving--we are living the future. For example, before there were no computers. There are so many things happening, some bad some good, but young people have so many more opportunities. I didn't have those opportunities. I only got as far as third grade and then I went to cosmetology school as an adult. I'm self-educated.
- I really don't know, I never heard of it.
- No, I don't know
- I don't understand
- No, I don't know that.
- Nothing really
- I don't know.
- I don't even know what Earth Systems is.
- It could be a few things. Weather for one. Economics is a world system, so that's one.
- I don't know what you mean by that.
- About the planet I guess, I'm not sure.
- The world in general.
- I don't use that. I don't know what that means.
- No, I don't know
- No, I don't know.

Earth Processes and systems

- Geological systems that regulate the way the Earth does what it does. I don't know, first time I heard the term. Rivers have a way they flow and volcanic activity plays a part in

certain ways the Earth works. The rotation of the molten metal in the Earth' core creates magnetic fields and that influences certain things. Also, the Moon affects the tides on Earth.

- I don't know what that means...I would guess things working together, like the circle of life.
- Earth processes & how they interact. Not being a scientist, quite of the number of the systems within the Earth.
- I'm thinking of the linked systems between water, air and life systems.
- I'm not sure exactly but what I think it would be would be water cycles, decomposition cycles.
- Ecology. It's like a body system, respiratory, circulatory. When one goes down, body Earth overcompensates to try and get back together. Compensatory isn't quick, like it is in the body, if it's out of sight, it's out of mind.
- Not really. Nature systems. Weather and Rain.
- It's like geology. Processes that the Earth goes through.
- The water system because that's Earth-wide.
- Weather systems.
- Ecosystems in themselves encompassing populations and balances I nature. The influence the either and climate. I'm thinking of Darwinism and that man is the only species that can change the environment to his needs. Everyone else adapts to the environment.

Solar System

- Not sure. Maybe the Solar System.
- It sounds like a mobile with the sun and planets going around. Perhaps it has something to do with climates.
- Earth rotations. If the earth didn't spin, it wouldn't exist. We wouldn't exist.
- I was just talking with my stepdaughters on how the earth really spins.

Unspecified Earth references

- Core of the Earth, Oceans and how that affects us, the way the Earth moves and shifts, the environment like animals and plants, the solar system, that affects us, too, it's proven.
- Rainforest, Sonoran Desert, back home: West Virginia, hills, mountains.
- Forests, oceans, caves, deserts, coastal areas.
- Trees, plants, sky, pretty much everything.
- Earthquakes, when a volcano is about to erupt.
- The different climates, time zones and the different evaluation.

Other

- I don't know if I would use that team because it's always changing. We might not see it but there's beach regions and earthquakes. I remember when I moved to Virginia Beach

in 1976. It used to be moderate, then it got extremely hot up to 100 the first week in June. It was like that for 7-8 years and then it went back to moderate.

Respondents did feel that their local environments were interconnected, with two-thirds rating areas as being totally or almost totally connected.

Table 8: How much does change to the environment in one area impact change in another area?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Totally |
|-------------------|-------------------|----|----|----|-----|-----|----------------|
| Percentage | 7% | 2% | 0% | 7% | 16% | 27% | 41% |
| N | 3 | 1 | 0 | 3 | 7 | 12 | 18 |

N=44

For both the Discover Earth and the Discover Tech exhibits, we queried patrons on their preferences within a range of titles.

Title Choices: Discover Earth

For the Discover Earth exhibit, half the visitors preferred the “Century of Change” subtitle. Another quarter preferred Discover Earth with no subtitle. Ten percent had no preference, and the remaining preferred the “One Hundred Years of Change” subtitle.

Table 9: Preference of Discover Earth Titles

| Race/Ethnicity | Percentage | N |
|--|------------|----|
| Discover Earth: A Century of Change | 50% | 22 |
| Discover Earth | 23% | 10 |
| Discover Earth: One Hundred Years of Change | 18% | 8 |
| No preference/undecided | 9% | 4 |
| Total | 100% | 44 |

Individuals generally thought that the Century of Change subtitle was catchier and more specific. Others stated that having no subtitle allowed the exhibit to encompass more, to address a wide range of topics.

Full comments by title choice were:

‘Discover Earth: A Century of Change’ Comments

- That's going to give you 100 years of all that's been going on.
- It sounds better.
- The temperature of the Earth increased one degree last year. You can't say that climate is changing, you need to take a longer view. I suspect climate change was responsible for lost civilizations like Mayans and those in South America even before the Spanish came.

Climate change affects human life. Look at Beijing today with the dust storms from the Gobi Desert. Nothing they can do about it--that city will disappear one day.

- It just works.
- It's more short and it captures it.
- It has to do with the changes that have taken place. Learn about what has happened in the last 100 years, how it was then and how it is now, how we have progressed.
- It just sounds like something to grab your interest. It grabs you.
- It's not as long as (One Hundred Years of Change) and the short one (Discover Earth) isn't catchy enough and not specific enough.
- It has more detail, it's more catchy.
- I think it's more specific the century makes more sense. It's more to the point.
- Seems more interesting than the other two. Not as elementary or ambiguous.
- It just rolls off the tongue better. The other is cumbersome. It gives people the long view.
- I like that century word, it has a good connotation.
- Been a lot of things changed during the century get people's attention.
- The first one isn't specific enough and the 2nd one is too long.
- When you say century of change, that word century makes people come out and see what's different.
- More descriptive than the first and more concise than the second
- I think the century term is better.
- I'd like to see how it changed over a century.
- History-based environment. People don't like ancient history so this would be more current.
- I like to go way back then. I'd rather live back then.
- More than what I know about that.

'Discover Earth' Comments

- It sounds more flexible than the others. The other two sound too straightforward (meaning too limiting).
- People might get it better. There's no difference between the other two (he means because a century is 100 years)
- Because I think you'd find out the Earth has been the same for eons. Read the Bible. All that mankind has proven in 6,000 years is that the Bible is true.
- Because it would involve more, sounds more general, could mean more than environmental change.
- I like them all.
- Finding out about Earth, fossils, bones and things.
- People don't understand the Earth's atmosphere

- It seems to encompass a lot more, the other two narrow the topic. The first one is not so constricted.
- Because it would put you up-to-date, rather than 20-25 years ago. You'd see the things that were effecting the environment now.
- Because initially that will be the beginning, the planet's birth itself. That's where it all starts.

‘Discover Earth: One Hundred Years of Change’ Comments

- It sounds like what we are talking about in this interview.
- It has more meaning to it.
- One hundred years and a century are the same. One hundred years is simpler.
- I'm 44. I've seen a lot of changes and I'm sure there's more I'm not even thinking of.
- Because children these days are a whole different generation, not responsible, have no work ethic. They are digital kids, they don't know how to dial a phone, they don't know how to read time on a regular clock.
- What they had back then to what they have today. Al the new inventions they have today that they didn't 100 years ago.
- I'd like to see how it's changed in the last 100 years.

Title Choices: Discover Tech

Nearly half of the individuals interviewed selected the subtitle “Engineers make a world of difference”, finding it provocative and less bland. One quarter selected the subtitle “Engineering Solutions”, stating that that the concept of solutions was important to society. Eighteen percent selected Discover Engineering. As in Discover Earth, individuals who preferred titles without subtitles made that choice because the titles were shorter and less specific.

Table 10: Preference of Discover Tech Titles

| Race/Ethnicity | Percentage | N |
|--|------------|----|
| Discover Tech: Engineers make a world of difference | 43% | 19 |
| Discover Tech: Engineering Solutions | 25% | 11 |
| Discover Engineering | 18% | 8 |
| Discover Tech | 11% | 5 |
| No preference/undecided | 2% | 1 |
| Total | 99% | 44 |

Totals do not add to 100% due to rounding.

‘Discover Tech: Engineers make a world of difference’ comments

- Seems like it would show people how the environment changes and how they can take care of Earth better, the environment better. Earth and the environment are the same thing.

- I don't know the context of what's being asked. I've seen a lot of change in my lifetime. My grandmother was born in 1893 and she went in her lifetime from seeing covered wagons to seeing a man on the moon.
- Sounds like you'd be seeing what tech is, examples of that. With the other titles, people might think it's above their level.
- We are looking for change, a better world--going green and stuff like that.
- Okay, maybe I should look at this & pay attention.
- Clear enough, speaks to more people.
- Seems provocative.
- Because it's more of an active thing, how each engineer has changes, this will be less bland centered on change.
- Engineers make everything work, put things together.
- The world needs a world of help.
- It would be something different.
- More people would probably do that, it doesn't sound as highbrow.
- I like the making a difference.
- I would want to know how engineering makes a difference. The other ones I'm not so interested.
- I'm sure it will.
- Since I'm not familiar with Engineering, this is more descriptive. The others are more formal.
- Because I think it contributes to the current situations and recommends that we need to make changes.
- I'd like to know what type of engineers make a world of difference.
- Even though it's a lot of math, it's making things work better.

'Discover Tech: Engineering Solutions' comments

- Because it gives people the idea that engineering gives solutions and people don't really know what engineers do.
- This is the most important because they look for solutions, they make the world better, they make the progress of the world.
- Because solutions gives people the idea of what can I do. Everyone wants to be a part (he means of the solution) but they don't know what to do.
- Because that way one can learn how to avoid certain situations, so that pipes don't break (she means as a result of earthquakes), so that bridges are good and are well made.
- We're all interested in solutions.
- I work at integrated technologies. I run the cutting department, we do a lot of work for the military and related industries. You have to be right on the money without losing material. There's only 1/8" and you can't be off. The engineering's do the plans and draw it but we have to make it happened. There's no room for error there, so you have to

do samples. I don't have the schooling, the college degree, but I'm the one that works with the engineers and then with the folks in my department. I have to be able to think like an engineer to make it work. IN my line of work, if it doesn't work the first time, you've to work on it. You've got to be the one that solves the problem.

- They can find solutions, not the same old things all the time.
- Help the young children discover things they don't know about and make a difference.
- It sounds like taking something negative and making it positive, improving it making it better.
- If we can connect with the solutions and the problems we're having. If through technology and engineering we can make it better.
- 2nd is too long again. Because the third one encompasses everything.

'Discover Tech' comments

- Because it's broadest
- Because the others might be too complicated to get kids involved, when I think of engineering too boring to attract many people
- So I could see technically how it's changed.
- I'm not too into technologies and stuff.

'Discover Engineering' comments

- Because I don't know much about it.
- I don't like the word tech because I'm not technical.
- It doesn't limit you, you can talk about any kind of engineering. Discover Tech title-- young people might think it has to do with the Internet, cell phones.
- I just like it.
- I don't know much about it so I'd like to see something about that.
- That's the best one to me.
- If you're trying to attract a younger crowd. Because it seems like it would attract curious minds. The others would attract folks that are already engineers, older folks.
- It's the shortest.

Participation in Photo Wall

Finally, we asked patrons about their interest in contributing to a photo wall. One quarter of the participants stated they were not at all interested, and a total of 52% rated the idea at the midpoint of the scale or lower. One quarter of the individuals stated they were tentatively interested, and just under one-fifth stated they were extremely interested.

Table 11: How interested would you be in contributing to pictures to a photo wall?

| Ranking | 1 - Not at all | 2 | 3 | 4 | 5 | 6 | 7 - Extremely |
|-------------------|---------------------------|----------|----------|----------|----------|----------|--------------------------|
| Percentage | 26% | 10% | 2% | 14% | 21% | 7% | 19% |
| N | 11 | 4 | 1 | 6 | 9 | 3 | 8 |

N=42

In order to interpret these findings, it may be helpful to refer to Jakob Nielsen’s classic online participation metric. Nielsen advanced a concept known as 90-9-1, where 90% are ‘lurkers’ who never contribute to the community, 9% are contributors, but on a seldom basis, and 1% of participants in the community make the majority of the contributions.

**Space Science Institute
STAR_Net Front-End Evaluation
Interview Guide – English Version**

Date: _____
Location: _____
Interviewer: _____ **Interview #:** _____

Gender: M F

Race/Ethnicity: White _____ Asian-American _____ Hispanic/Latino _____
(Check all that apply) African-American _____ Native American _____ Other: _____

Interview Questions

1. When you think of the environment, what comes to mind?

2. How much does change to the environment in one area impact change in another area?

Not at all 1 2 3 4 5 6 7 Totally

3. How much do you know about the natural history of your local area?

I know nothing 1 2 3 4 5 6 7 I am an expert

Follow-up: Can you give me any examples of that?

4. Do you think there a difference between Weather and Climate?

Yes _____ No _____

Follow-up: If yes, what is that difference?

5. When you think of Earth Systems, what comes to mind?

6. To what extent do any of those Earth Systems have an impact on your life? How so?

7. How much has the environment changed in your local area over the last 100 years?

Not at All 1 2 3 4 5 6 7
Totally

Follow-up: In what ways?

8. How interested would you be in contributing pictures to a photo wall here in the library demonstrating environmental change?

Not at All Interested 1 2 3 4 5 6 7 Extremely
Interested

9. How would you rate your interest in Science?

Not at All Interested 1 2 3 4 5 6 7 Extremely
Interested

10. How would you rate your interest in Engineering?

Not at All Interested 1 2 3 4 5 6 7 Extremely
Interested

11. Of the following titles, which do you prefer? Why?

Discover Earth

Discover Earth: One Hundred Years of Change

Discover Earth: A Century of Change

Follow-up: What do you think an exhibit by that title would have in it?

12. Of the following titles, which do you prefer? Why?

Discover Tech

Discover Tech: Engineers Make a World of Difference

Discover Tech: Engineering Solutions

Discover Engineering

Follow-up: What do you think an exhibit by that title would have in it?

13. How often do you come to this library?
Several times a week ____ Weekly ____ Monthly ____ Every other month ____
A few times a year ____ Never ____

14. Do you visit more than one library branch? Yes ____ No ____

15. Thinking back to the last visit you made to the library, what sorts of activities did you do then? (*Check all that apply*)

Look for Books ____ Check out Books ____ Attend a Public Program/Event ____
Read Magazines/Newspapers ____ Use the Internet or other programs on the Computers ____
See an exhibit ____ Other: _____