

## **Opening Minds to Science**

THE SAINT LOUIS SCIENCE CENTER'S REPORT TO THE COMMUNITY

We visited especially for the *Destination Moon* exhibit and loved it! The displays really helped to convey the feeling of the time period and the excitement of the landing. Being close to the Apollo artifacts was a very moving experience.

**SCIENCE CENTER VISITOR | APRIL 2018** 

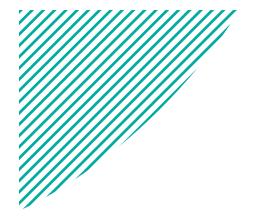
We've loved this place since we were kids. We got to see all of our old favorites and our children get to learn and explore the new. Great day out!

**SCIENCE CENTER VISITOR | JULY 2018** 

This place is filled with curiosity. I've been [coming] here since I was three and I am not even tired of going here.

SCIENCE CENTER VISITOR | SEPTEMBER 2018





# **Barbara Boyle**

Dear Friends, Partners, and Supporters,



It is my pleasure to present the sixth edition of Opening Minds to Science – The Saint Louis Science Center's Report to the Community, 2018, our yearly review of our continuing efforts to gather and utilize audience data. This work supports us in fulfilling our mission: To ignite and sustain lifelong science and technology learning.

The information presented here speaks to one of the focus areas of our strategic plan, *Understanding and Engaging our Audience*, under which we seek to "continuously learn more about our audiences to inform how we engage them."

This report highlights a number of key findings from our visitor studies work in 2018, including an overview of our general public visitor demographics, guest feedback about the overall visit experience, and a look at how exhibit evaluation informs the development and review of our interactive galleries and programs.

We take a closer look at evaluation studies that supported the new *GameXPloration* exhibit and the augmentation of *Destination Moon: The Apollo 11 Mission.* We also reflect on what visitors are learning in the *Mission: Mars* galleries. We close with an overview of educational programs, featuring a peek into the popular *Chicken Chat* program in *GROW*.

As you review this report, I hope you discover helpful insights about our visitors and how they connect with curiosity here at the Saint Louis Science Center.

Sincerely,

Bachara Bayle



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### **Our Data**

### How do we learn about our visitors?

Our visitors and their experiences are central to everything we do at the Saint Louis Science Center. We use audience research and evaluation to better understand our visitors and their experiences with Science Center offerings. This work is done following best practices in the field of visitor studies. Data are systematically collected, analyzed, and communicated so they can inform decisions about exhibitions, programs, and operations. This is accomplished through methods such as surveys, comment cards, interviews, and observations.

### DATA PRESENTED IN THIS REPORT WERE COLLECTED THROUGH A VARIETY OF METHODS, INCLUDING:



**Exit Surveys** of adult, general public visitors that provide key information, including visitor demographics, visitation patterns, and likelihood of recommending the Science Center. The Science Center is one of over 20 science museums across North America participating in the Collaboration for Ongoing Visitor Experience Studies (COVES) where all participating institutions collect comparative visitor data through a common exit survey. COVES is managed by the Museum of Science, Boston.



**Comment Cards** that staff distribute each day to a random sample of visitors throughout the facility with the invitation to "let us know how your visit goes today."



**Exhibit Evaluation Studies**, in which the feedback visitors provide via interviews and surveys, along with observations of how visitors engage with exhibits, are used to inform the design and development of new exhibitions and to assess the overall effectiveness of completed exhibitions.



The Science Center's internally developed System for Assessing Mission Impact (SAMI), which collects and summarizes key performance indicators for educational programs.



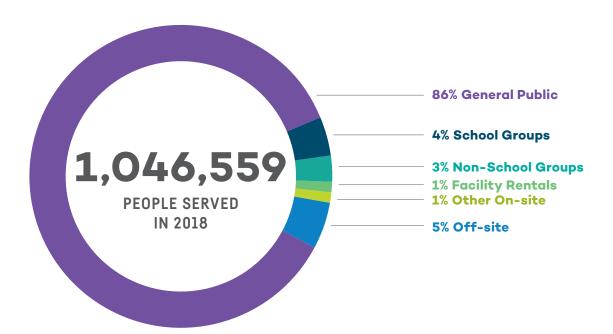
Some of the data that are used in this publication were made available through the Collaboration for Ongoing Visitor Experience Studies (COVES). Neither the Museum of Science (Boston) staff nor COVES bear any responsibility for the results or conclusions presented here.

### **People Served**

### How many people does the Saint Louis Science Center reach?

The Saint Louis Science Center monitors daily attendance through the use of on-site door counters and by tracking attendance at off-site programs.

In 2018, the Science Center reached 1,046,559 people. The majority, 95% (993,564 people), were on-site visitors. The remaining 5% (52,995 people), experienced educational programs and community outreach activities at off-site locations such as schools, community centers, and the Challenger Learning Center-St. Louis.





### **General Public Audience Profile**

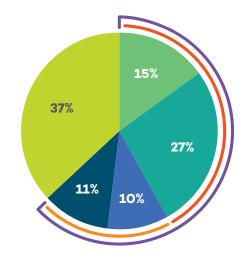
### Who are our visitors?

Every month, a randomized sample of our adult, general public visitors are invited to participate in a survey at the end of their visit. These surveys provide key information on demographics and visitation patterns. In 2018, a statistically valid sample of 1,113 visitors were surveyed.

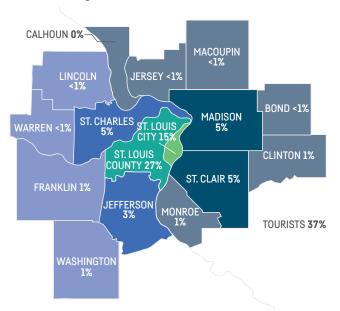
### **GENERAL PUBLIC VISITORS' RESIDENCE**



- St. Louis County
- Metro Area MO Counties
- Metro Area IL Counties
- Tourists
- All Local Residents 63%
- Local Zoo-Museum
   District Residents 42%
- Local Non Zoo-Museum
   District Residents 21%



Visitors represented 35 states plus several countries. The majority of visitors (63%) reside in the Metro St. Louis area, including St. Louis City, St. Louis County, and the surrounding Metro area counties in Missouri and Illinois.

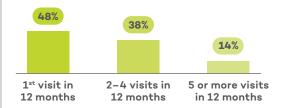


### FIRST TIME VS. REPEAT VISITORS

Over three-quarters of general public visitors are repeat visitors.
On average, these repeat visitors came to the Science Center 2.8 times during the previous 12 months.



### HOW OFTEN DO REPEAT VISITORS COME TO THE SCIENCE CENTER?



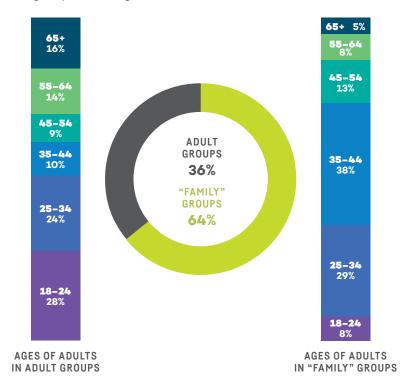
#### SCIENCE CENTER MEMBERSHIP STATUS

Most general public visitors are not current Science Center Members.



#### **VISITING GROUP TYPE AND AGE RANGES**

Although the majority of adults visited in groups that include children, over one-third visited in adult-only groups. Most adults in "family" groups were age 25-44, while most adults in adult-only groups were age 18-34.



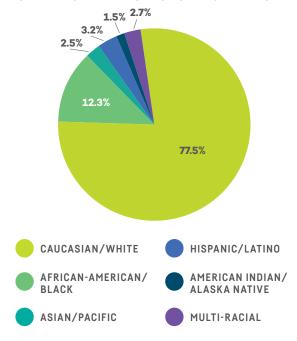
The typical "family" group consisted of two adults and two children. In total, 35% of "family" groups included children ages 0-4, 59% included children ages 4-7, 54% included children ages 8-12, and 24% included children ages 13-17.

Visitors in adult groups typically come in groups of two; however some visit in larger groups and others visit by themselves.

### HIGHEST LEVEL OF EDUCATION COMPLETED

The Science Center's adult, general public visitors tend to be fairly well-educated, with more than two-thirds holding at least a college degree.

#### OVERALL GENERAL PUBLIC AUDIENCE ETHNICITY



### VISITORS FROM THE ST. LOUIS METRO AREA

The racial/ethnic distribution of Science
Center visitors who reside in the St. Louis
area (St. Louis City, St. Louis County, and
the surrounding Metro area counties in
Missouri and Illinois) is similar to the 2017
US Census Bureau data for the St. Louis
Metro area (the most recent data available).

	2017 US CENSUS DATA FOR ST. LOUIS METRO AREA	2018 SCIENCE CENTER LOCAL VISITORS
Caucasian/White	76%	73%
African-American/ Black	18%	15%
Asian/Pacific	2%	2%
Hispanic/Latino*	3%	3%
American Indian/ Alaska Native	0.2%	2%
Multi-racial	2%	4%
Other	1%	0.4%

\*The US Census tracks Hispanic data separately from race data; total exceeds 100% for the US Census data column.

Some High School		Some College	Some Graduate Some College Work		
<b>2</b> %	9%	21%	40%	6%	23%
	gh School Degree		College Degree		Graduate Degree

### **General Public Audience Profile**

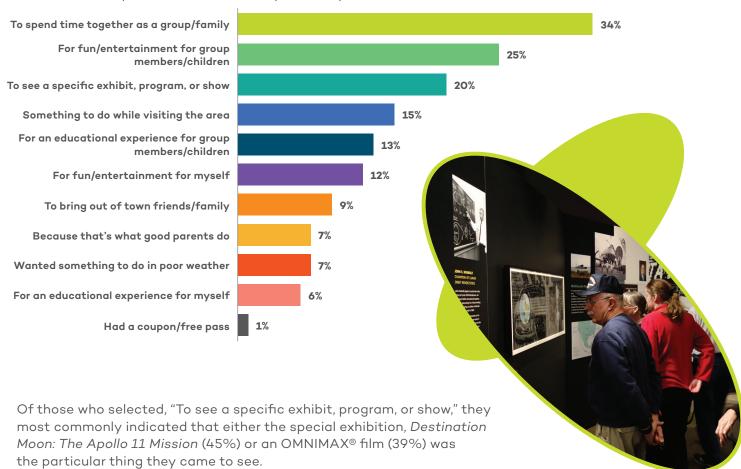
### Why do people visit the Science Center?

### PRIMARY REASON FOR VISITING

As part of the exit survey, visitors are asked to select from a list of 11 options, the two primary reasons for their Science Center visit. Overall, the most commonly selected reason for visiting the Science Center was for the social experience of spending time with others in their group.

#### PRIMARY REASONS FOR VISITING TODAY

(Respondents could select up to two options. Total exceeds 100%.)



Motivations differed by group type:



People visiting in groups that included children appeared to be primarily motivated by others in their group, most commonly citing spending time together as a group/family (41%) and fun/entertainment for others in their group (32%).



Those visiting in adult-only groups appeared to be more motivated by personal interests, most commonly citing seeing a specific exhibit, program, or show (34%) and fun/entertainment for myself (25%).

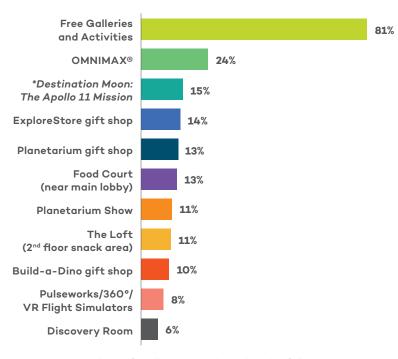
### **General Public Audience Profile**

### What do guests do during their visit?

### **AREAS VISITED**

Most visitors spent time in the free galleries. The OMNIMAX® Theater and the special exhibition, *Destination Moon: The Apollo 11 Mission*, were the most heavily visited revenue producing areas.

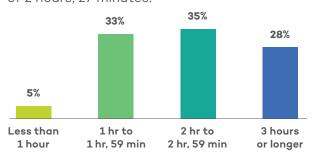
(Multiple responses possible. Total exceeds 100%.)



<sup>\*</sup> Percentages shown for all items are based on the full year. *Destination Moon: The Apollo 11 Mission* was open April 15 – September 3.

### HOW LONG DO VISITORS STAY AT THE SCIENCE CENTER?

In 2018, visitors stayed an average of 2 hours, 27 minutes.



### FREE GALLERIES AND ACTIVITY AREAS VISITED

Exit survey respondents identified which galleries they spent time in during their visit. *Ecology & Environment*, home to the Science Center's iconic animatronic dinosaurs, was the most heavily visited, as it has been in previous years.

(Multiple responses possible. Total exceeds 100%.)

Ecology & Environment	73%
Mission: Mars – Control	<b>57</b> %
Experience Energy	<b>57</b> %
Life Science Lab – Atrium	53%
Structures	53%
Mission: Mars - Base	45%
Makerspace	43%
Dig Site	36%
GROW	35%
Paleontology Prep Lab	32%
Liftoff	27%
Amazing Science Demonstrations	19%
Math Cart	19%
Take the Controls	18%
^GameXPloration	16%
Life Science Lab - Activity Benches	13%
Life Science Lab - Classroom	11%
^Nano	6%

<sup>^</sup>Percentages shown for all items are based on the full year. Nano was removed March 15. GameXPloration opened October 13.



### **Voice of the Visitors**

### What do visitors say about their Science Center experiences?

For over 20 years, the Science Center has used comment cards, which staff distribute every day to a random sampling of visitors, as a tool for tracking guest satisfaction and collecting feedback.

### COMMENT CARD FEEDBACK

In 2018, visitors completed 958 comment cards, on which they rated their visit from "Below Expectations" to "Above Expectations" using a four-point scale. The majority of the ratings (72%) were a '4,' with a total of 93% of the comment cards having a rating of either '3' or '4.'

Percent of comment cards that had a positive rating ('3' or '4' on a scale from 1 to 4)

The comment cards also invite visitors to provide any feedback they choose to share. Visitors' comments are coded into 23 different categories based on the topic addressed. The comments are further identified as either a "Positive/General" comment, which expresses satisfaction or no problem, or an "Opportunity for Improvement," which expresses dissatisfaction or offers a suggestion.

Of the 958 cards guests completed in 2018, 91% included one or more comments, resulting in 1,465 total individual comments. More than three-quarters of these were positive in tone. Overall, the most commonly mentioned topics were: Galleries, Staff, OMNIMAX®, and General Positive.

TONE OF VISITORS' COMMENTS





"Wonderfully interactive even for 2 retired folks - we built arches, tested buildings for earthquakes, [and] watched a presentation on electricity so much fun! Thanks."

"We had such a fun time doing math puzzles with the Science Center volunteer. All the staff & volunteers were AMAZING!"

"The Planetarium was - wow! Incredible. I learned a lot about the solar system. Great information. My daughter and grandchildren learned a lot too!"

"We always enjoy the permanent exhibits and activities, too. And GROW - it's great! There's always more to see and do than we have time for!"

"The lab where you can do hands-on experiments was fun! We loved all the different experiences."

"I love the updates you have made to your exhibits over the last few years. The Gaming exhibit was especially cool."

"The kids love the fact that every time we go there, there is always new adventures."

"We went to see Destination Moon and were not disappointed. Fantastic display and interactive activities."

"The OMNIMAX films that we've seen over the years have been, put simply, fantastic! Keep up the good work by selecting the best that are available."

"Would like see some exhibits geared toward adults. Lots of stuff for kids."

"An entrance door is needed on the parking lot side. It is too far to walk plus, in bad weather, too uncomfortable."

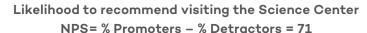
The Science Center's exit surveys, which use a common set of questions from the multi-institutional Collaboration for Ongoing Visitor Experience Studies (COVES), provide two additional measures of satisfaction: the Net Promoter Score (NPS®) and the Overall Experience Rating (OER).

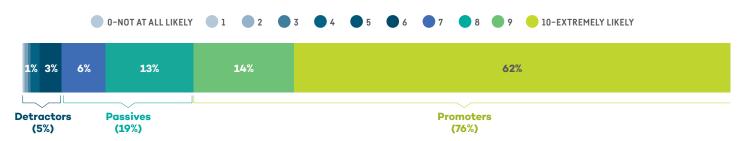
#### **NET PROMOTER SCORE (NPS®)**

The NPS, which asks visitors how likely they would be to recommend visiting the Science Center, is a question used in a variety of service industries. On a scale of 0 – "Not at all likely" to recommend to 10 – "Extremely likely" to recommend, those who provide a rating of '9' or '10' are considered "Promoters," those giving a rating of '7' or '8' are considered "Passives," and those whose rating is '6' or lower are

considered "Detractors." The NPS is calculated by subtracting the percentage of Detractors from the percentage of Promoters, therefore the possible scores range from -100 to 100. In 2018, the Science Center's NPS was 71, indicating a high level of satisfaction. For comparison, the 2018 NPS for the more than 20 science museums participating in COVES was also 71.

#### 2018 NET PROMOTER SCORE (NPS®)





### **OVERALL EXPERIENCE RATING (OER)**

The Overall Experience Rating (OER), which measures satisfaction, was developed and tested by the Smithsonian Institution. It has since been adopted by a number of cultural institutions and is included on the COVES exit survey tool. The OER asks respondents to rate their visit as "Poor," "Fair," "Good," "Excellent," or "Superior." By providing an option that exceeds "Excellent," the OER scale allows for greater

differentiation about visit satisfaction than other measures. This is the first year the Science Center has collected OER data.

In 2018, over 80% of respondents rated their Science Center experience as "Excellent" or "Superior," suggesting a high level of satisfaction with their visit. Just as with the NPS rating, the Science Center's OER ratings were comparable to the OER ratings across the aggregate of all science museums participating in COVES.



### Exhibit Evaluation – GameXPloration

### How do we use evaluation to shape new exhibits?

The purpose of front-end evaluation is to take an initial look at what audiences know, are interested in, and have questions about around a certain topic. In the early stages of exhibit development, front-end evaluation provides key information used to shape an exhibition's design, experience, and content.

Early in 2018, Research & Evaluation joined preliminary discussions about creating a new interactive exhibition themed around games and gaming. This exhibition was intended to reach out to teens and give them a place where they felt comfortable to hang out and learn something at the same time. The result was *GameXPloration*, which opened in October.

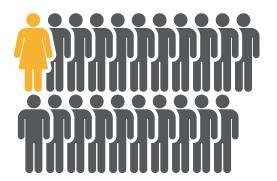
### **ENGAGING TEENS**

To explore more about what teenagers would want and expect to see in an exhibition on games and gaming, we ran a survey with our Youth Exploring Science (YES) teens. YES is a long-standing Science Center program where high school students learn STEM skills and science communication. A total of 70 teens filled out the survey.

### "DO YOU CONSIDER YOURSELF A GAMER?"

The working title for the exhibition was "Gamer's Village." This reflected both the overall concept of the gallery – everyone plays games – and the intended feel of the space. However, only 30% of the YES Teens considered themselves

Only 1 out of 21 "gamers" was **female.** 



to be "gamers." Of those, only 1 out of 21 "gamers" was female. This suggested that the word "gamer" may be a barrier to entry for girls and young women who do not associate with the term. This finding led the team to re-think the name of the gallery.

### "NAME FIVE GAMES"

We learned that the teens associated the word "game" with a variety of game types. Though almost all of them (88%) wrote in at least one video game, nearly half (49%) mentioned a sport or activity and over a quarter (28%) wrote in a board game. More than half (59%) of all games the teens listed were video games, but their broad definition of "game" suggested that the exhibition should address multiple types of games.



Teens expected a well-rounded exhibition that featured classic and current games to play; a fun, social, competitive atmosphere; the latest gaming equipment; and information on the history of games, gaming technology, and the game creation process. This showed that the balance between games and the content presented would be important for teens to be engaged.

# Exhibit Evaluation – Destination Moon

### How do visitors help us test interactive exhibits?

The goal of formative evaluation is to improve exhibit design by including visitors in iterative testing of exhibit concepts. This process, conducted while exhibit design is being developed and refined, addresses both functionality and communication of educational content.

In 2018, the Science Center hosted the Smithsonian Institution's traveling exhibition, *Destination Moon: The Apollo 11 Mission*, featuring the Command Module "Columbia." To complement the exhibition, the Science Center developed additional immersive and interactive exhibits about the Apollo missions and St. Louis' role in the early days of the space program. As part of developing these exhibits, several prototypes were tested with visitors. Here, we highlight one interactive that underwent formative evaluation to refine the design.

### THE CONCEPT

Using transparent images on a light table, visitors would piece together nine, overlapping lunar photographs to recreate a portion of a lunar map and learn how early lunar maps were made.

### WHAT WORKED

Visitors understood they were making a map of the moon and many were able to identify craters in the images. Completing the map was challenging – only 58% of the observed groups successfully completed the map; however many visitors (although not all!) enjoyed the challenging nature of the activity. The exhibit worked well for adults and older children (at least age 11).

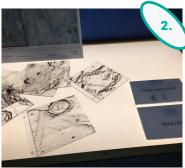
### WHAT DIDN'T WORK

- Some visitors had difficultly determining the overall shape of the map and how to start.
- In making the original lunar maps, part of the process involved overlapping matching features.
   The exhibit was designed to replicate this, but the prototype map pieces were made of a thick, rigid plastic that did not overlap easily.

#### WHAT CHANGED

- Visitors suggested that the activity needed hints. Two hints were added to flip panels – one about the pieces overlapping and one about using the craters' shadows to orient the pieces. While some visitors opted not to use them, the hints allowed more groups to successfully complete the map.
- The final map pieces used a thinner, more flexible plastic that overlapped more easily.
- In the final exhibit design, a raised edge defined the map workspace.
- The final version included an image of the completed map as a hint where visitors could "check their map."







- 1. The first iteration of the prototype exhibit
- 2. Testing hints on flip panels
- 3. The final exhibit

### **Exhibit Evaluation – Mission: Mars**

### What does evaluation tell us about the effectiveness of exhibits?

The goal of a summative evaluation is to determine if the overarching goals for an exhibit are being met and to collect systematic data about how visitors are using and moving through the exhibit. The Science Center worked with Tisdal Consulting to conduct a summative evaluation of the *Mission: Mars – Control* and *Mission: Mars – Base* exhibit galleries, which were created through the support of a NASA-funded grant award.

Mission: Mars – Control and Mission: Mars – Base are two exhibit galleries that are physically separate, but linked in content and experience. Control is located in the Main Building while Base, situated in the Planetarium, is nearly one-quarter mile away. In Control, visitors step into an Engineering Lab, where they learn about the design of the Mars rovers, and Mission Control, where they program a model rover that is located in Base. In Base, visitors learn about the science conducted on Mars by stepping into the shoes of a scientist working on a simulated future Mars base.

The overall reaction to the galleries was positive, with visitors indicating that, after their visit, they had a higher level of knowledge about Mars, a more positive attitude about NASA and Mars exploration, a better understanding of skills involved in studying Mars, and a more aspirational outlook about the roles of scientists and engineers on NASA's Mars missions.



The majority of visitors to *Control* were able to identify two of the three key themes ("Big Ideas") running through the exhibit: engineers build, test, and program Mars rovers for science missions (identified by 100% of survey respondents); scientists and engineers working for NASA are diverse in gender, ethnicity, and age (30%); and that scientists and engineers work together to explore Mars (63%). In *Base*, the majority of respondents were able to identify all three Big Ideas: that scientific exploration of Mars helps us understand Earth (57%); that in the future, scientists will be living and doing scientific work on Mars (75%); and that scientists and engineers work together to explore Mars (57%). The fact that most of the Big Ideas were clear to the majority of respondents indicates that many of the intended messages of the galleries are successfully communicated to visitors.

#### **FOCUSED OBSERVATIONS**

In mid-2018, the Science Center added a twopart interactive in Control that allowed visitors to build and test their own rover. The purpose of the Rover Design and Testing Stations was two-fold: to introduce the idea that rovers needed to traverse many different types of Martian terrain and to encourage visitors to use the Engineering Design Process to build, test, and redesign their rovers.

The evaluation found that the interactive was most effective at moderate levels of crowding. When the gallery was empty, visitors were unable to see others building and testing their rovers and may have missed the connection between these two components. At very high levels of crowding, pieces were scarce and it was more difficult for adults to sit and engage with their children.

The interactive worked best for children over eight years old and adults. They completed multiple design and test iterations, improving or changing their rovers based on how it ran on the track. Follow-up interviews also indicated that they knew they were building a "rover" and, in some cases, were taking direct inspiration from the models of Opportunity and Sojourner located near the build table. Slightly younger children, between ages five and seven, understood the design challenge to build and test, but believed they were making a "car."

The ease with which users understood the design challenge and iterated the build and test phases suggests that other institutions should consider duplicating this two-part interactive.

#### SUMMARY

Visitor satisfaction and impact both indicate that challenging project goals have been accomplished in Mission: Mars. Visitors should benefit from these accomplishments for years to come and other science centers and museums may consider replicating some of the innovative designs including programming, transmission, and watching model rovers perform scientific work on simulated Mars landscapes.



"It's a cool way for them to build things and test them out, try to see what's wrong, and what they can change."

FEMALE, AGE 20-29



"I was thinking about how to get it over the uneven landscape...I know that they go to Mars and they collect samples of rocks, and they learn more about rocks on Mars and they can just explore Mars."

MALE, AGE 8





### **Educational Programs**

### How do we track engagement in Science Center programs?

Since 1997, the Saint Louis Science Center has collected information about the experiences of participants in our programs. We define programs as "staff-led interactions scheduled for a specific audience with written educational goals and objectives." Our System for Assessing Mission Impact (SAMI) tracks what programs are delivered, the frequency with which programs occur, the number of participants, and the immediate impact of those programs.

The Science Center offers programs to a wide range of audiences, including the general public, children, families, schools, and adults. The programs vary in frequency: there are recurring programs, such as *Teen Science Café*; programs delivered upon request, such as *The Biology of 'The Giver*;' and programs offered daily, such as *Chicken Chat*. In 2018, a total of 233,460 participant interactions occurred across 75 distinct programs, which were offered 6,542 times.

#### 2018 SCIENCE CENTER PROGRAMS BY THE NUMBERS

Average number of programs delivered by Science Center Educators every day

5,773

Number of hours of programming delivered by Science Center Educators

### WHAT IS THE IMMEDIATE IMPACT OF PROGRAMS?

The Impact Score is a numerical way to represent the impact that program participation has on an individual. In the short-term, impact is illustrated by a change in 1) knowledge/understanding, 2) attitude, 3) interest, and/or 4) enjoyment.

Program participants answer questions about each of the four impact factors. The sum of these ratings, each on a four-point scale, is the Impact Score. The lowest possible Impact Score is four and the highest is 16.

Of all interactions, 58% happened in General Public programs.



2018 Year-End Impact Score.

13.94

[OUT OF 16.00]

In 2017, the score was 13.77.

#### SPOTLIGHT ON CHICKEN CHATS

Each morning at the Science Center, visitors have the opportunity to learn more about the chickens living in *GROW*. Chicken Chats started in 2017. We began tracking the program in our System for Assessing Mission Impact in January 2018. In 2018, the program was delivered 317 times for 5,728 visitors.

GROW Educators present information on the Science Center's chickens, providing set content and answering visitor questions. Interested visitors also have the chance to feed the chickens a treat. The intent of the program is to provide visitors with information on chicken biology, behavior, care, and more so visitors can start raising their own flock or just learn about the characteristics of these birds.

2018 Chicken Chat Impact Score

14-41 [OUT OF 16.00]

The average Impact Score for General Public Programs in 2018 was **14.55**.

An average of 18 visitors attended each *Chicken Chat*. A total of 113 participants provided SAMI ratings, with 84 (74%) of them also commenting on the program (17 children and 67 adults).

When asked what they got out of their experience, 41% of children focused on biological messages around digestion and reproduction. Adults provided comments about enjoying their overall experience (27%) and what they learned about chickens (32%), but adults also appreciated the hands-on nature of the chat (16%).

Aside from the intended messages about biology, care, animal behavior, and defining characteristics

"Had not previously thought of chickens as forest-native animals."

of chickens, messages about habitat (6% of total respondents), chicken evolution (5%), and the chicken's role in our food supply (4%) were also mentioned by visitors.

"Very nice to show people where food actually comes from." Suggestions for improvement included increasing the level of interactivity through opportunities to handle the chickens

or doing the chat inside the chicken enclosure.

Others just wanted to know more. With this positive feedback about the program, visitors making connections to the intended content, and an overall high Impact Score (above 14.00), Chicken Chats has proven to be a strong program among the Science Center's daily offerings.

"Great information for varied development levels. Loved the feeding/ interaction."



### **Closing Thoughts**

We hope you have enjoyed these highlights from our visitor studies work in 2018. These data provide valuable insights into who visits the Science Center, what they do and learn about during their visits, and help us as we develop and refine our exhibit galleries and educational programs. As we continue these studies, we look forward to sharing more findings with you in the future.

