Designing our Tomorrow:
Mobilizing the Next Generation of Engineers
Public Audience Front-end Evaluation

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Executive Summary of Evaluation Findings

This front-end evaluation study is part of *Designing Our Tomorrow: Mobilizing the Next Generation of Engineers*, a five-year project (2018–2023) led by the Oregon Museum of Science and Industry (OMSI) with the support of the National Science Foundation (NSF, DRL-1811617) and project partners: Adelante Mujeres, the Biomimicry Institute, and the Fleet Science Center. The *Designing Our Tomorrow* (DOT) project seeks to promote and strengthen family engagement and engineering learning via compelling exhibit-based design challenges, presented through the lens of sustainable design exemplified by biomimicry. This front-end evaluation was conducted to inform exhibit development.

The aim of this evaluation study was to understand more deeply how girls and their families relate to and care about sustainability issues, the natural world, and how they envision a present and future where the natural world and human-made designs merge and build a reciprocal and sustainable relationship. The evaluation team conducted four focus groups with girls from Oregon and California and 67 interviews with visitor groups from OMSI and the Fleet Science Center between November 2018 and June 2019. This executive summary presents highlights from all groups.

The key findings of the evaluation study are outlined below.

Thoughts on sustainability issues: Interview respondents and focus group participants expressed familiarity and interest in sustainability issues. When talking about and ranking specific sustainability issues (drawn from the United Nations Sustainable Development Goals), participants demonstrated particular interest in providing access to clean water. Additionally, participants observed that the Sustainability Goals are interdependent and that creating sustainable designs involves considering trade-offs.

Relationship to the natural world and emotions about the future of the environment: Participants' relationships to nature varied depending on the geographical region in which they grew up. Most participants described a positive memory in nature and gave examples of activities they do regularly in nature. When interview participants were asked how they felt about the environment in the future, 58% expressed emotions coded as "concern" (such as worry or nervousness), 35% expressed emotions coded as "optimistic" (such as hopefulness and inspiration), and 7% expressed both "concern" and "optimistic" emotions.

Interview participants expressed a necessity for the exhibit to state past and present harms to the environment and provide an opportunity to imagine a positive, optimistic, and most of all, sustainable future. Although participants expressed the desire for a simulation or a realistic visual of the damage caused, they also expressed that youth and adults need representations of positive social change and opportunities to envision innovative designs for positive futures.

Designs that fit in with nature: When interview respondents were asked to imagine designs that "fit in with nature," their ideas focused on creating systemic impact and redesigning infrastructure to be sustainable. For example, participants shared ideas for green spaces, eco-friendly building designs, sustainable transportation, and renewable energy solutions. When talking about the exhibit, participants

stated they wanted an opportunity to design things, rather than passive activities where visitors press buttons to watch demonstrations or animations.

Girls' interests: Focus group participants were asked to create a story in an ideal world and describe their roles in that world, the geographical areas of interest, and the sustainability issues that would be addressed in the story. Some of the girls imagined a city that merges with the natural world that is both environmentally and socially conscious. Some of the girls expressed an interest in a story that represented a realistic or fantasy relationship between a young girl (9–14) or a young adult and her elder; some were even interested in inter-species relationships.

Front-end Evaluation Overview

Designing our Tomorrow: Mobilizing the Next Generation of Engineers (DOT), a five-year project (2018 - 2023) led by the Oregon Museum of Science and Industry (OMSI) with the support of the National Science Foundation (NSF, DRL-1811617) and project partners Adelante Mujeres, the Biomimicry Institute, and the Fleet Science Center, seeks to broaden participation in engineering and build capacity within the informal STEM (science, technology, engineering, and mathematics) education field while raising public awareness of the importance of sustainable engineering design practices. DOT will integrate tested informal science education (ISE) programs and exhibits with current knowledge of design challenges, biomimicry, and sustainable engineering. Led by teams of diverse community stakeholders, and in partnership with local and non-local girl-serving organizations, DOT will leverage existing exhibits and girls groups to impact girls' sustainable engineering-related interests and identities.

This front-end evaluation study implemented at the beginning of the project was intended to help the project team learn more about the relationships of girls ages 9 to 14 and their caregivers to sustainability issues and practices, personal and cultural connections to the natural world, and promising narratives to empower girls and their families to engage in exhibit-based experiences regarding sustainable engineering. This report presents the methods and results of activities carried out with public audience members.

Evaluation Questions

The aim of the front-end evaluation was to gather information from our target audience about the following questions:

> ‣ What are the **sustainability challenges** that girls and their families find **personally relevant**?

> ‣ How do girls and their families imagine themselves participating in **sustainability practices**?

> ‣ What **personal and cultural connections** do girls and their families perceive between the natural world and their lives?

> ‣ What are **promising narratives to empower girls** and their families to engage in exhibit-based experiences regarding sustainable engineering?

Methods

This study was grounded in culturally responsive approaches to evaluation, in which the evaluator considers the culture and context of participants and of the program as important aspects to assess the project's goals and its impacts (Frierson, Hood, & Hughes, 2010).

The culturally responsive approaches included:
> ‣ A diverse team including bilingual, Latina evaluators
>
> ‣ Co-development or translation of all data collection instruments into Spanish
> ‣ Inclusion of members of Latino communities and other communities as participants

‣ Data collection in English and in Spanish (as appropriate, based on participants' preferences)
‣ Coding and analyzing data in the source language

All data collection instruments were developed by OMSI's *Designing our Tomorrow* project team, in collaboration with Rockman et al., the Fleet Science Center in San Diego, and Adelante Mujeres, an organization located in Forest Grove, Oregon, that works to educate and empower low-income Latina women and families.

The study employed a mixed-methods design that gathered data through activities such as surveys, card sorts, and interviews (see Appendices B–P for instrument examples). The study can be broadly divided into two data collection methods: interviews and focus groups, as the table below shows.

Table 1. Data collection methods and locations

Study (in chronological order)	Participants	Location	Recruited by
Discovery Sprints 1–5 (interviews)	Family groups	OMSI (Portland, OR)	OMSI evaluators on the floor
Focus groups 1 and 2	Latina girls	W.L. Henry Elementary School (Hillsboro, OR) and Whitford Middle School (Beaverton, OR)	Adelante Mujeres
Interviews	Family groups	Fleet Science Center (San Diego, CA)	OMSI evaluators on the floor
Focus group 3	Latino girls	Barrio Logan College Institute (San Diego, CA)	Barrio Logan College Institute / Fleet Science Center
Focus group 4	Latino girls	Fleet Science Center (San Diego, CA)	Be WiSE program of the Fleet Science Center

Interviews

To ensure instruments were aligned with the evaluation questions and also resonating with participants, the OMSI team conducted five Discovery Sprints. These Discovery Sprints involved having DOT team members engage in activities to begin imagining possible exhibit approaches, then reflecting on questions these activities raised about the target groups' interests, knowledge, and motivations. Evaluators collaborated with a project team of designers, developers, and researchers to design and iterate five interview instruments. These interviews were then conducted with visitors on the OMSI floor. The activities, questions, and report-backs happened over the course of about 3 days for each of the five discovery sprints, with a limited number of participating family groups (2–10) for each sprint. While all interviews addressed sustainability, the questions asked at each sprint were different, so that evaluators received varied results depending on the framing of each question. The interview instruments used to collect data with family groups at the Fleet Science Center were developed from the last iteration of the Discovery Sprint at OMSI. Throughout the report, interview data from Discovery Sprints at OMSI are called out explicitly.

Table 2 in the next page describes the process used by the evaluation team for the interviews in chronological order.

Table 2. *Interview phases, locations, themes, and number of participants. The "appendices" column indicates the appendices of this report with the corresponding instruments for each phase.*

Process step	Data collection location	Theme	Appendices	Number of participating groups
Discovery Sprint 1	OMSI	Memories and feelings related to the natural world	B and C	9
Discovery Sprint 2	OMSI	Humans within the natural world	D and E	10
Discovery Sprint 3	OMSI	Technology and sustainability	F	4
Discovery Sprint 4	OMSI	Sustainability issues	G	1
Discovery Sprint 5	OMSI	Themes from sprints 1–4 combined	H and I	2
Interviews	Fleet Science Center	Themes from sprints 1–4 combined	H and I	41

In an effort to gather a variety of perspectives from members of the project's target audience (girls between the ages of 9 and 14 and their families), the interviews were conducted with family groups with girls between the ages of 7 and 17 visiting OMSI and the Fleet Science Center. The interviews focused on participants' relationship to nature, concerns about the future of the environment, personally relevant community and sustainability issues, and imagining a world that fits in with nature.

Focus Groups

Girls participated in focus groups during after-school programming at Adelante Mujeres, Be WiSE at the Fleet Science Center, and the Barrio Logan College Institute.

Program coordinators invited girls from their respective after-school programs and girls voluntarily participated in the focus groups with written consent from their caregivers. Evaluators used interactive activities and techniques tailored to participants' age range. The focus groups discussed relationships to nature, concerns about the future of the environment, personally relevant community and sustainability issues, and imagining a world that fits in with nature.

Sustainability Goals

In consultation with the exhibit developers, during the first sprints, the evaluation team explored different ways to evaluate visitors' perceptions and priorities when thinking about sustainability. As a result, the team decided to implement a sorting activity in all focus groups, in the Discovery Sprints 4 and 5 (conducted at OMSI), and in the interviews conducted at the Fleet Science Center.

For the sorting activity, participants were asked to individually sort "sustainability goals" cards from most important to least important. The sustainability goals were developed from the United Nations' seventeen Sustainable Development Goals (UN SDGs).

As the evaluators conducted the interviews and focus groups, the selection, grouping, and wording of the sustainability goals were adjusted for better understandability and to reflect contemporary topics of interest. For example, *Healthcare for All* was included as an issue that has drawn much attention in the U.S., and *Immigration Rights* was included as a sustainability goal because girls from the first two focus groups brought up this issue several times. Table 3 in the next page shows the UN SDGs and the transformation of the sustainability goals for each study. Appendix A shows the Spanish translations of the sustainability goals.

Table 3. *Transformation of the sustainability goals*

United Nations Sustainable Development Goals	Focus Group 1	Focus Group 2	Discovery Sprint 4	Discovery Sprint 5, Focus Groups 4 and 5, Fleet Interviews
No Poverty	There is an abundance of food, water, clothing, and shelter for everyone	There is an abundance of food, water, clothing, and shelter for everyone	Affordable housing	Affordable housing
Zero Hunger	Agriculture, forestry, and fisheries provide nutritious food for all	Farms, forestry, and fisheries provide nutritious food for all	Affordable and healthy food	Affordable and healthy food
Good Health and Well-Being	Everyone has healthcare	Everyone has healthcare	Healthcare for all	Healthcare for all
Quality Education	Everyone has quality education	Everyone has quality education	Quality education	Quality education
Gender Equality	All girls and women are part of political and economic decision making	There are leaders of all genders everywhere		
Clean Water and Sanitation	Fresh water and sanitation facilities are available in all countries	Fresh water ecosystems and sanitation facilities are accessible in all countries	Access to clean water	Access to clean water
Affordable and Clean Energy	All countries use clean energy	All countries use clean energy		
Decent Work and Economic Growth	Living wages and safe working conditions contribute to economic growth	Fair pay & safe work conditions contribute to a fruitful economy	Fair pay and safe work	Fair pay and safe work
Industry, Innovation, and Infrastructure	Cities prosper in harmony with the natural world	Cities prosper in harmony with the natural world		
Reduced Inequalities	Everyone is paid a fair amount their work	Everyone is paid a fair amount their work		
Sustainable Cities and Communities	Buildings, roads, and transportation are reliable and resilient	Buildings, roads, and transportation are reliable and resilient		
Responsible Consumption and Production	Companies reduce waste and pollution they produce	Companies reduce waste and pollution	Waste and pollution management	Waste and pollution management
Climate Action	The planet has balanced ecosystems	The planet has balanced ecosystems	Climate change	Climate action
Life Below Water	Animals and plant life are thriving underwater	Animals and plant life thrive underwater		Plant and animal life thrive
Life on Land	Animals and plant life are thriving on the land	Animals and plant life thrive on the land		Plant and animal life thrive
Peace, Justice, and Strong Institutions	Peace, justice, and violence-free society	Peace, justice, and violence-free society	Anti-violence	Anti-violence
Partnerships for the Goals	Harmony exists among all people and countries	Harmony exists among all people and countries	Immigration	Immigration rights

Data Analysis

Quantitative data were analyzed using basic descriptive statistics and summarized in tables. Qualitative data from interviews and focus groups were recorded in their original language (English and Spanish), which allowed evaluators to capture and assess nuances not always translatable from one language to another. Qualitative data were analyzed using inductive coding (Patton, 1990; Strauss & Corbin, 1990), which allowed researchers to identify emergent themes and patterns in the data without the limitations imposed by predetermined categories.

Limitations

As in any study, this evaluation had certain limitations. The instruments of the interviews and focus groups were refined iteratively, so that the data gathered were not the same for each data collection shift. Additionally, Discovery Sprint interviews were conducted with small numbers of participants. Quotations will indicate whether data were gathered at OMSI or the Fleet Science Center.

A Note on Tables and Quotations

Tables throughout the report reflect only the responses from the subset of participants who answered a given question. Quotations (indicated by quotation marks and *text in italic*) show the place where the interview took place (OMSI or Fleet) and the interview number. Quotations also show whether the respondent was a man, woman, boy, girl, or unknown. This gender information was taken from the post-interview demographics surveys filled out by the participants. For example, *[Fleet #23, girl].*

Pseudonyms were used to protect the identity of the focus group participants. The two focus groups conducted in California and the two focus groups conducted in Oregon did not differ greatly in their responses, so responses from each focus group are not differentiated throughout this report. Headers will indicate if the data shown was gathered in Oregon, California, or both locations.

To improve readability, the quotations from interviewees and focus group participants in this report were edited, eliminating pause fillers (uhm, err…) and other expressions that are not relevant to the content of what was being expressed (words such as yeah, you know, etc.).

Report Structure

The results of this study are presented in two parts: Part 1 discusses the findings of the interviews conducted at OMSI and the Fleet Science Center. Part 2 presents the results of the focus groups conducted with participants recruited through *Adelante Mujeres* and the results of the focus groups carried out in San Diego, with participants recruited through *Be WiSE* at the Fleet Science Center and the *Barrio Logan College Institute* after-school programs.

Respondents

Interviews

A total of 67 OMSI visitors participated in Discovery Sprints at OMSI. Figure 1 in the next page shows the collected self-reported demographic data. Demographic information was not collected from visitors who participated in the first Discovery Sprint so a portion of participants' ages, races, and genders are unknown.

Close to half of the participants identified as white, followed by visitors who identified as Black or African-American, Hispanic or Latino, Pacific Islander, and Asian. More than half of respondents identified as female, and most adults who provided their age were more than 31 years old.

Discovery Sprint Participants: Ethnicity/race
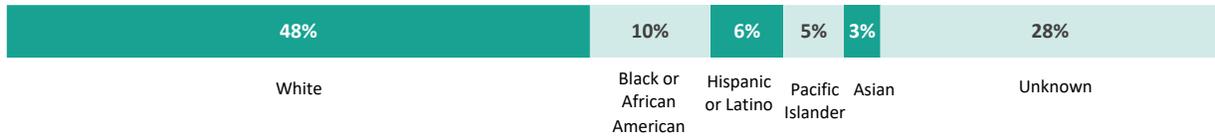
48%	10%	6%	5%	3%	28%
White	Black or African American	Hispanic or Latino	Pacific Islander	Asian	Unknown

Discovery Sprint Participants: Gender

56%	18%	26%
Female	Male	Unknown

Discovery Sprint Participants: Ages

5%	21%	6%	5%	4%	10%	13%	36%
0–8	9–11	12–14	15–18	19–30	31–40	41+	Unknown

Figure 1. Demographic data of Discovery Sprint participants

A total of 102 Fleet visitors participated in the interviews. Figure 2 below shows some of the collected demographic data. Here, the proportion of participants that identified as white was smaller than in the Discovery Sprints (37%), followed by almost a third of participants who identified as Hispanic or Latino. Other respondents self-identified as Pacific Islander, Asian, Native Hawaiian, Middle Eastern, or other. About 80% of respondents identified as female, and the largest portion of adults was 36–55 years old.

Fleet Participants: Ethnicity/race

Middle Eastern
Native Hawaiian
Prefer not to say

37%	31%	5%	13%	3%	3%	1	1
White	Hispanic or Latino	Pacific Islander	Asian	Other			

Fleet Participants: Gender

81%	19%
Female	Male

Fleet Participants: Ages

40%	10%	15%	32%	3%
7–12	13–18	19–35	36–55	55+
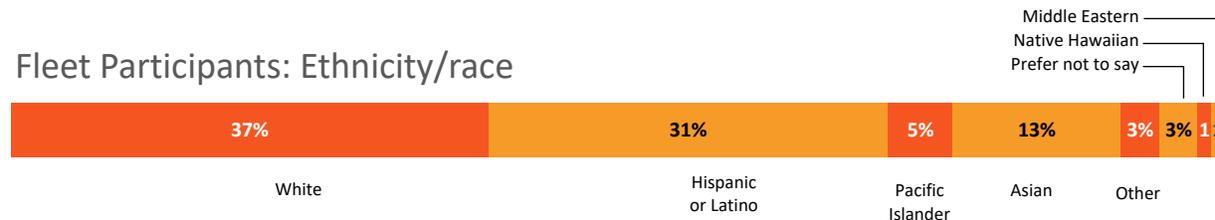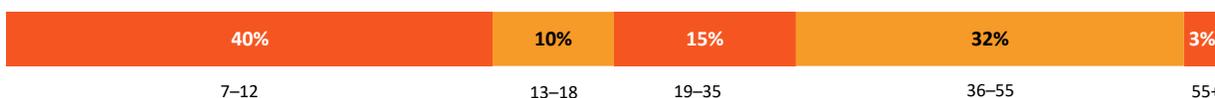
Figure 2. Demographic data of Fleet interview participants

Focus Groups

A total of 41 girls participated in the four focus groups. Forty-six percent of girls were between the ages of 9 and 11 and 54% were 12 to 15 years old.

Part 1: Results of Interviews with Museum Visitors

Summary: Results of Interviews with Museum Visitors

Part 1 of this report is a description of the results of interviews with museum visitors at OMSI and the Fleet. For the readers' convenience, this brief summary of findings is provided before the more detailed results below.

Personally Relevant Sustainability Challenges
One of the evaluation questions guiding this study is *What are the sustainability challenges that girls and their families find personally relevant?* From a selection exercise using a modified version of the United Nations' Sustainable Development Goals, the evaluators learned that participants cared about access to clean water, plant and animal life, and waste and pollution. When participants were asked about issues in their community that were important to them, waste and pollution, disconnection from community, and affordable housing were frequently mentioned. When discussing the future of the environment, the top three issues participants mentioned were climate change, pollution, and animal extinction. Participants often noted that environmental, community, and economic issues are interconnected.

Personally Relevant Sustainability Practices
Another evaluation question guiding this study is *How do girls and their families imagine themselves participating in sustainability practices?* When discussing personally actionable sustainability practices, participants mentioned recycling, utilizing re-usable products, and picking up trash. When participants were asked how they imagine making things that fit in with nature, they envisioned green spaces, renewable energy, eco-friendly building designs, Reduce, Re-use, and Recycle, curbing and preventing waste and pollution, reducing plastic products, reducing the use of cars and fossil fuels, and increasing public transportation as systematic and actionable sustainability practices.

Personal and Cultural Connections Between the Natural World and Everyday Lives
Participants were asked what they liked to do in nature to gather insights on the third evaluation question, *What personal and cultural connections do girls and their families perceive between the natural world and their lives?* Respondents identified hiking or walking, observing animals and plants, and exploring as activities they enjoy doing in nature. This was followed by playing, being in water, camping, gardening, contemplating, breathing and smelling, enjoying nature's noises, and other activities. Participants mentioned their home, backyard, or neighborhood most often when they discussed the location of their favorite activities in nature, followed by the beach, rivers, lakes, and waterfalls.

Promising Narratives to Empower Girls and their Families to Engage in Exhibit-based Experiences Regarding Sustainable Engineering
Related to the fourth evaluation question, *What are promising narratives to empower girls and their families to engage in exhibit-based experiences regarding sustainable engineering?*, participants were asked what feelings they had about the environment in the future. Fifty-eight percent expressed emotions coded as "concern" (such as worry, fear, or nervousness) and 35% expressed emotions coded

as "optimistic" (such as amazement, excitement, or hopefulness). When participants were asked what they would like to see in the exhibit, they mentioned a simulation of what the world would be like if action is taken to protect and preserve the environment and prevent climate change, alongside what the world would look like if action is not taken. Additionally, some participants mentioned Reduce, Re-use, and Recycle as a notable process and action they wanted to learn more about.

Full results of Interviews with Museum Visitors

Personally Relevant Sustainability Challenges

Sustainability Goals

For the sorting activity (detailed in pages 5-6 under "Sustainability Goals"), participants were asked to individually sort 11 "sustainability goals" cards from most important to least important.

Table 4 below shows the average rank that participants gave to each sustainability goal. One hundred and two participants ranked the sustainability goals; of these, three were from the Sprints conducted at OMSI and 99 participants were from the Fleet Science Center. While sorting, 16 participants mentioned that the goals were all important and 10 expressed that it was hard to sort the cards.

Table 4. Respondents' average ranking of the 11 sustainability goals. The position of each sustainability goal in the importance ranking (first, second, third…) for every respondent (including children) was used to calculate the average rank; as a result, a lower rank equates to a greater degree of perceived importance.

Sustainability goals	Average rank (N=101)
Access to clean water	3.69
Plant and animal life thrive	5.25
Waste and pollution management	5.30
Healthy and affordable food	5.42
Quality education	5.72
Healthcare for all	6.00
Anti-violence	6.36
Climate action	6.49
Affordable housing	6.90
Fair pay and safe work	7.28
Immigration rights	7.48

The following sections describe the reasoning that some participants expressed when talking about the importance of specific sustainability goals.

Access to Clean Water

Access to water was often seen as a resource that reduces disease and health issues in order for focus on one's education or career. This participant describes how access to clean water contributes to the health and betterment of the global community:

"You take care of water, access to clean water, a lot of stuff starts clearing up. Not as many diseases start popping up. People can worry less about how they're so sick and dying or they can't grow food properly and they can focus more on education." [Fleet #37, man]

Although this participant valued clean water, she viewed it as a global need because she did not see it as an issue in her own community:

"I put Access to Clean Water as more of a global idea because there is clean water pretty much everywhere in this area." [Fleet #8, woman]

Plant and Animal Life Thrive

This participant describes the connection between plants, animals, and humans:

"Well, we really need plants and animals. The plants are helping—they're like taking in the stuff to make our oxygen. And all the animals are around us are helping us in a bunch of different kinds of ways." [Fleet #16, girl]

Respondents also mentioned a relationship with the earth:

"I decided that I would put Plant and Animal Life first because it's really important to our Earth and without Earth, there would be no life." [Fleet #17, girl]

Participants that explicitly explained the importance of animal and plant life were mostly girls. An adult respondent who ranked the *Plant and Animal Life Thrive* card at the bottom explains a different perspective:

"Plant and animal life, I think the reason I have it down towards the bottom is because this is more towards the human race. Plant and animal life, is important. It's important for our system, but that's why I had it at the bottom." [Fleet #39, man]

Waste and Pollution Management

Some respondents explained the importance of waste and pollution management by pointing to the consequences of unmanaged waste on animals, humans, or life in general. This participant focused on animal life:

"I picked Waste and Pollution Management first because animals at the sea are getting stuck in the (inaudible) like plastic that humans throw inside the water. It could hurt other animals." [Fleet #9, girl]

This participant describes the effect of pollution on natural features:

"The first one for me was waste and pollution management because it's—our oceans are getting dirty, our air pollution is getting dirty, and, well, it's—there's also acid rain because of waste—acid waste" [Fleet #16, girl]

Healthy and Affordable Food

Some participants, such as this woman, saw food as a basic necessity:

"Food is obviously like, you need it (laughs). And I think it's important for people to have, and we live in an area where like, there's a lot of agriculture, so we have access to a lot of fresh and organic vegetables and fruits, but not everywhere is like that." [Fleet #1, woman]

Farther reaching consequences of healthy and affordable food were identified by a young respondent:

"Affordable and healthy food is also important because it helps with those people who attain those jobs and make our world a better place." [Fleet #29, girl]

Quality Education

Respondents who explained the importance of this sustainability goal frequently reflected on the consequences of education. This respondent pointed at economic and environmental impacts that education can have:

"Quality education revolves around the world. If you get enough for the human capital it can increase a country's GDP and that has a huge effect on the environment. If someone knows a lot about one subject such as the environment it could help with the environmental issues that we currently have." [Fleet #29, girl]

Participants also saw education as a holistic solution for a variety of issues:

"Well, again with education, I think that if you have quality education, you can learn how to fix all these things." [Fleet #31, woman]

Healthcare for All

Participants explained the importance of healthcare to them in broadly altruistic terms. For example, a girl expressed healthcare as a basic human need, regardless of likeability:

"Healthcare for all means, care for other people even though you don't like them or even though they smell nasty, always healthcare them, like feed them, give them some money and help them out. " [Fleet #21, boy]

Participants also mentioned the cost of healthcare when thinking about its importance:

"It's really expensive here so everybody should be able to access healthcare." [Fleet #35, woman]

Lower-ranked Sustainability Goals (Anti-violence, Climate Action, Affordable Housing, Fair Pay and Safe Work, and Immigration Rights)

When discussing **Anti-violence**, respondents talked about general violence being a problem in the world, sometimes referring to specific types such as bullying or gun violence:

"Well, with anti-violence, the world is slowly becoming more and more violent. (…) Well, just with gun violence and just people in general being hateful towards each other. I don't know how else to explain it other than people being hateful. " [Fleet #38, woman]

Although most participants who discussed **Climate Action** talked about its importance, some manifested doubts about its urgency. Throughout the interviews, some participants expressed concern about how much they could do to help climate change. This was reflected in this participant's opinion:

"Sí, pues el clima, no podemos hacer mucho y…No se puede hacer mucho."(Yes, well the climate, we can't do a lot and we can't…there is not much that can be done.) [Fleet #2, woman]

Housing was also discussed by participants. This participant sees housing prices as an issue that affects him as well as other people:

"It's something that I think about a lot because the cost. I wonder, can we ever buy a house? With the cost of housing and how much we make. (…) And so that, I know that, if my situation is that I have a decent salary, what about all of the people that are making less it's even worse for them." [Fleet #31, man]

Although many children saw housing as an important issue, some younger participants did not personally relate to this topic:

"For this [housing] I don't really know because I don't really pay attention to this, but I can see as to why that is important, but for me, I just don't really focus on these right now because I'm a kid." [Fleet #40, girl]

Similarly to affordable housing, some children explained that they did not place **Fair Pay and Safe Work** as a higher-priority issue because of a lack of personal relevance:

"Well, I don't really care how much money we get for our jobs. Other people might, I mean I don't have a job so I don't really know how that works." [Fleet #1, girl]

Immigration Rights was selected as the "least important" sustainability goal most often, and participants described their logic for placing it last.

This participant describes how reducing health conditions and violence, access to clean water and affordable housing should idealistically reduce the need or desire for migration:

"I put Immigration later because I think that if some of these other things are addressed globally, health conditions, access to clean water, anti-violence, it's—people aren't going to be fleeing awful situations. So, I think without all those other things that Immigration rights is more important, but attending to global, you know housing and anti-violence, and access to clean water, all those things, that Immigration is less important." [Fleet #17, woman]

Participants who listed immigration rights as more important, were often directly or indirectly impacted by immigration in their personal lives. For example, one participant says:

"I mean that's—for me personally, being that we're you know, Mexican-American immigrants, at least our family is, I can say that one kind of hits close to home." [Fleet # 22, man]

Assigning Value to the Sustainability Goals

When discussing the order that participants chose for their sustainability goals, certain values emerged across the interviews. The following table articulates how participants ascribed value to certain sustainability goals. The ascribed values were either intrinsic ("water is life") or related to other sustainability goals. The table includes the values expressed most often (3 mentions or more) and does not represent all values shared by participants.

Table 5. Responses to "Can you tell me about how you ordered the sustainability goals?"

Sustainability goals	# of mentions (N = 101)	Values assigned
Waste and Pollution Management impacts Plant and Animal Life, Access to Water, or Climate Action	20	Waste and Pollution Management was often described as a method that positively impacts plant and animal life, access to clean water, and contributes to climate action.
Quality Education: Education contributes to awareness and action	18	Quality Education was described as a resource that can contribute to raising awareness and positive action for the betterment of our environment, society, and economy. Seven participants acknowledge that educational inequities currently exist and must be challenged.
Affordable Housing: Housing is expensive	15	Affordable Housing was often described as critical because of the rising cost of living and increase in homelessness: *"I see a lot more homelessness, a lot more people that are struggling or having to live like more people in apartments or homes just to make ends meet" [Interview 18, woman]*
Access to Clean Water: Water is life	14	Access to Clean Water was most often described as instrumental for all life and/or survival on earth
Plant and Animal Life Thrive: Balanced ecosystems and reciprocity between humans and plant/life is necessary	14	Plant and Animal Life were often defined as instrumental part of the life cycle: *"you take one thing out and then the other things can't survive." [Fleet #15, girl]*

Sustainability goals	# of mentions (N = 101)	Values assigned
Immigration rights: Immigrant rights are human rights	13	Immigration Rights were often positioned as human rights. However, immigration rights were also situated in opposition to other resources that were described as basic needs, like housing, water, and food. Other participants placed immigration rights against the environment: *"if we don't even have an Earth that's clean for us to be on here, it doesn't matter who's trying to cross the border. Not to say it like that, but that's how it is."* [Fleet #21, man]
Anti-violence: We need to come together to end violence	11	Anti-Violence was often defined as necessary in order to "come together." However, it was not always clear what participants wanted to come together about.
Healthcare for all: Healthcare is expensive	11	Healthcare for All was most often cited as expensive and yet a resource that everyone deserves in order to be healthy.
Immigration Rights: Basic needs and the environment before immigration rights	9	
Climate Action: Climate action will affect the future of our planet	8	Climate Action was most often described as a phenomenon that would affect the future of the entire planet.
Quality Education: Educational inequities exist	7	
Quality Education contributes to a stronger economy	7	
Healthcare for All: Everyone deserves to be healthy	5	
Fair Pay and Safe Work: Fair pay contributes to affordability	3	Fair Pay and Safe Work was described as valuable so that people could afford housing, food, water, and other resources.

Sustainability Goals as Interconnected

Table 6 in the next page shows the ways participants described how they view the sustainability goals as interconnected. The participants who described interconnection often did so without prompting and seemingly did so to avoid prioritizing one goal over the other; these interconnections are evident in many of the quotes presented up to and after this point in the report and illustrate the complexity of the global challenges and corresponding goals being discussed. This table does not include all of the ways in which participants articulated interconnection.

Table 6. *Responses to "Can you tell me about how you ordered the sustainability goals?"*

Connecting Sustainability Issues	# of mentions (N = 101)
Affordable Housing, Healthcare for All, Quality Education, Fair Pay and Safe Work, and/or Immigration Rights contribute to reducing violence	8
Climate Action, Plant and Animal Life, Access to Clean Water, and/or Waste and Pollution Management are interconnected	8
Waste and Pollution Management affects Plant and Animal Life	7
Waste and Pollution Management affects Access to Clean Water	5
Access to Clean Water affects animals and humans	4

Community Issues Identified by Interview Participants

Participants were asked to identify issues that were relevant to their communities. The community issues were not selected from a pre-populated list, but were inductively identified through coding of participants' open-ended responses. Although participants were reminded that they did not need to solely identify environmental issues, most of the issues identified were positioned as environmental or related to environmental impact in some way. This table does not include all of the community issues identified by participants, but highlights issues with 4 mentions or more.

Table 7. *Responses to "What are one or two community issues that are important to you?"*

Community issues	# of mentions (N = 72)
Waste and pollution	20
Disconnection from community	14
Affordable housing and homelessness	10
Urbanization and growth	8
Destruction of animal habitats	8
Cars and transportation	5
Plastic usage and alternatives	4

Waste and Pollution

A participant shared her personal connection to waste and pollution:

"Also, from Mexicali and Ensenada. Ensenada is pretty clean. They have some trashy places, but in Mexicali the Earth is contaminated and I'm really worried about that because my little cousin lives there and once I was in the car with her and she started coughing." [Fleet #16, girl]

Her familial connection to the person affected by waste and pollution, as well as her recognition of places like Mexicali which are most affected by waste and pollution, make this issue personally relevant to her. In the case of another participant, her connection to the safety and concern of animals underwater made waste and pollution a personally relevant issue for her:

"We need more fish. So, we don't want them to die. We want to keep the water safe. We don't want to throw our trash on the ground and let it go into the little shelters. And then the shelter leads all of the trash to the water and the fish or the animals in the water like they think it's food, what they eat, what color it is, they might eat it and choke or die." [Fleet #21, girl]

> **Evaluators' synthesis statement**
> For these participants, making waste and pollution a personally relevant issue can be done by relating it back to the human experience, empathy for animals, and recognizing that certain geographical areas are most affected by waste and pollution.

Disconnection from Community

Participants identified disconnection from their community as another relevant community issue, describing it in a wide range of ways. One participant identified technology as a factor:

"I think that human interaction [is] being taken away. A lot of people nowadays are just getting more comfortable with staying inside. You know, like you can literally have anything delivered to you, from fast food, groceries, shopping, and things like that. So, I would say and, poor kids, just being out and getting that exercise. And again, like being replaced by computers and things like that." [Fleet #18, woman]

Meanwhile, another participant identified racism and discrimination to be a determining factor in disconnection:

"There's discrimination. Well not really in our community, but in other communities, like people of color things like that."

When asked to be more specific she stated,

"Racism. It's mostly the brutality, police brutality. Not really here, but everywhere else." [Fleet #40, girl]

Affordable Housing and Homelessness

It is notable that the majority of interview participants live in San Diego and Portland, cities where housing prices have risen considerably in the last decades. One participant described the rising cost of living in San Diego as a driving factor in homelessness and displacement:

"I'd say the rising cost of living, it's getting to a point where some people can't afford to live in San Diego, which unfortunately, they have to look elsewhere, somewhere that is affordable and that decreases

diversity within a region, which then makes it…if you only have one kind of economic, you know, society or whatever, then they don't see what happens in the rest of the world, they're less in touch." [Fleet #6, man]

Another participant described homelessness as a problem that is affecting her family:

"I think one of the main things where we live that can be a problem is homeless, the homeless community… There's like a lot of drug use and like needles, and people find in the parks and stuff which make you feel like you can't take your kids to the park cause you never know what you're going to find… I know it's not an easy solution, but I hope we can find one that's good." [Fleet#1, woman]

Urbanization and Growth

Participants who identified urbanization and growing cities as a community issue describe the environmental impact of remodeling and rebuilding their cities. This Portland resident who was interviewed in California states:

"We're in Portland so there's a lot of infill happening, you know, when they are taking old buildings, there's a lot of materials and things that go to waste, I think that's a really big environmental impact, remodeling, and just kind of ripping out, there's a lot of building and I think that, while there are some kind of new buildings coming in, just being aware of what they're taking out, and then also just avoiding that urban sprawl, it's kind of a delicate balance, so…." [Fleet #3, woman]

Another participant describes his concern with animal habitats:

"San Diego is growing so fast as a city and so we just continue to build and build and you start to see more animals' habitats get destroyed and you have new communities that are in the middle of where habitat was, so now you have snakes and you have wildlife around the homes, so I think just planning and building is a big issue." [Fleet #19, man]

> **Evaluators' synthesis statement**
> As cities continue to grow, engineers who design cities are tasked with imagining infrastructure that takes into account managing waste and pollution.

Destruction of Animal Habitats

Young girls in particular are concerned with the destruction of animal habitats:
"I don't want…There's a lot of animals, and I don't want to disturb the animals by putting extra stuff that's not good for them." [Fleet #1, girl]

"I have seen a bunch of dead animals this spring. A few hit by cars, some were killed by a cat. I think people need to be more careful about that kind of stuff and also I've seen a lot of trash in our neighborhood." [Fleet #3, girl]

Cars and Transportation

A family describes the impact car-based societies have had on their family's transportation, as well as the environmental impact they have:

"Father: I think about access to get around without cars. Like with her school, we have to drive there. There is no way to really walk there. It's so far way for her to get there by herself, with elevation climb. It's not easy to get to.

Mother: And since we both work, we had to get another car because before we were a one car family so we bought another car because it was really far for her to get to school.
Father: One car, for 6 or 7 years. Well, then we stopped taking public transit.
Mother: And there's too many cars on the highway and the pollution, but it's like you can't stop when you don't have access to walk to school. She can't walk to school and there's one more car on the road and we need more parking." [Fleet #31, family]

Plastic Usage and Alternatives
Across the United States, individuals are pressured to reduce their plastic usage by replacing straws and plastic bags with reusable products. A participant stated what she saw as a community issue:

"Using too many straws." [Fleet #26, girl]

Meanwhile, another participant shared her irritation:

"I hate paying for plastic bags. It's so annoying. Especially when you forget yours [reusable bag] at home." [Fleet #7, girl]

> **Evaluators' synthesis statement**
> Experts have suggested the importance of companies reducing their use of plastic to create system-wide change, rather than focusing on the individual consumer.

The Environment and Concerns for the Future

When participants were asked to think about the future of the environment, they described challenges, practices, and feelings. In this section of the report, the focus is on feelings and challenges that participants identified.

Figure 3 shows how participants expressed their feelings when asked about the environment and the future. More than half of the participants expressed feelings coded as concern (such as worry, concern, or fear), while about a third expressed feelings coded as optimistic (such as amazement, hopefulness, or inspiration).

Terms coded as "concern":
Worried, concerned, fear, nervous, urgency

Terms coded as "optimistic":
Amazed, excited, happy, hopeful, inspired
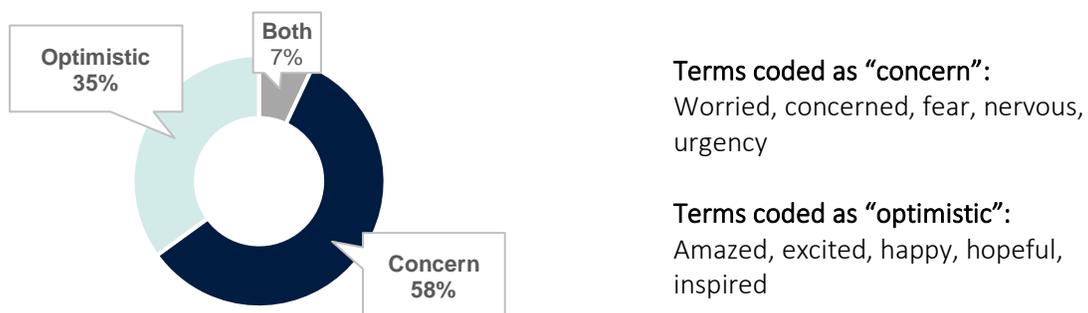
Figure 3. *Responses to "What are your feelings about the environment and the future?"*

When discussing their answers to the question *What are your feelings about the environment and the future?,* participants sometimes chose to share sustainability challenges they were concerned about for

the future of the environment. Table 8 below shows some of the challenges participants mentioned when thinking about the future.

Table 8. *Challenges mentioned when answering the question "What are your feelings about the environment and the future?"*

Sustainability Challenges	# of mentions (N = 41)
Climate change	15
Pollution	10
Animal extinction	7
Demolishing nature	7
Alternative materials	5
Sustainable housing	3

Climate Change

Climate change was the primary challenge that participants brought up when discussing the future of the environment. Participants described how climate change is affecting humans, animals, and the natural world.

Often, participants described climate change as a release of heat into the ocean or atmosphere. One participant describes the impacts of climate change she has personally experienced:

"How the temperature of the ocean is changing and we see the imbalance in the ocean. We just saw it at the beach." [Fleet #6, woman]

This woman shared how she has witnessed the increase of heat throughout her life:

"Really, it's one of my worries for me, humanly, I think about them. Simply, the climate, when I was a girl I remember what the climate was like before. Today it's totally different. I think when the sun is really strong you can't go out for 20 minutes. And you've already hurt yourself. Imagine what it's like right now. What is it going to be like in the future?" [Fleet #9, woman]

Pollution

As mentioned previously, when discussing pollution, participants found it important to disclose the places that are most affected by pollution:

"Yes, Cairo is the second or third most polluted city in the world. If I'm not wrong, the first is the city of Mexico. So Cairo is either second or third. And really, we can feel the pollution and you can see it anywhere. Even just by breathing. And if you go outside of Cairo, in Egypt, then it's different. Totally different."

The interviewer asked:

"So, it's just in Cairo?"

The participant responded:

"Yes, and outside it's different. There are a lot of like really clean cities, and also resorts. The closer to Cairo, it gets more polluted." [Fleet #28, woman]

Animal Extinction
A young participant shared how she has heard how animals underwater have been affected by straws:

"They kill turtles and animals because in the water they throw things away, so water…killing animals in water. The straws, they kill animals." [Fleet #2, girl]

Demolishing Nature
Another young participant described how trees are being cut down to build homes:

"Napkins. Cause they kill beautiful trees that birds and lots of animals need, and they put wastes. People are going to start cutting lots of trees. Cause they gotta start making lots of homes, you know." [Fleet #2, girl]

Alternative Materials
Plastic is often described as a material that causes damage to the environment. This participant described her frustration with the unnecessary packaging that is created by companies:

"There are so many unnecessary things. For example, all the packaging that is sold, really, there are so many things that we don't need. And if we took care of that we would change a lot. I worry about the future that we are leaving our children because every time they try to make it easier for us. So many things that they sell us today are to make our lifestyles easier. I think that is affecting us more, more trash, more contamination. It would be great to see changes in that aspect. Sometimes, I say, simply the cookies, they sell them in a huge packet with an even smaller packet inside of it. It's more trash and a lot of that can't be recycled here. So really, the future worries me, the planet, and how we're going to leave it for our children, our generations."

She added:

"Really, I wouldn't know how to… what we can do because sometimes, even if I say "well, I will try to reduce, to re-use a lot of stuff. Even if it makes a small difference, the companies keep making more. So really, How much can an individual do? What do you propose? . . .if it's going to work or not? Because often times the money [of] the companies is prioritized over our opinions and what we can do." [Fleet #6, woman]

Sustainable Housing

As mentioned before, housing was an issue that respondents commented on without being prompted. This adult participant reported:

"I just notice that they're building a lot more, so I kind of feel like the animals and the natural things that we need are kind of like, ugh!, or taken away." [Fleet #18, woman]

Personally Relevant Sustainability Practices

Individual Sustainability Practices

When participants were asked *What are your feelings about the environment and the future?*, 17 of them identified sustainability activities they practice or suggest that their community should practice. Participants were not explicitly asked to share sustainability practices in which they are involved. Each of the practices identified are focused on changing individual behavior, rather than creating systemic impact. Table 9 below shows sustainability practices mentioned two or more times and does not include all of the sustainability practices identified by participants.

Table 9. *Responses to "What are your feelings about the environment and the future?"*

Sustainability Practices	# of mentions (N = 17)	Illustrative Comments from Participants
Re-use and Recycle	6	*"We do little things at home, like I use a reusable coffee cup and reusable straws and stuff like that, just to do our small part (laughs)." [Fleet #1, woman]* *"I think people are learning that we just have this earth and that we should probably not throw everything away. We should try to recycle and re-use stuff." [Fleet #32, girl]*
Pick up trash/clean	4	*"I'll just say, I'm an activist, very strongly so. At school I try to pick up trash and that's what bothers me people aren't so noticeable of what is going on nowadays." [Fleet #34, girl]*
Protect and preserve	3	*"I think that we have to be very careful and protect what we have, because everywhere you look, you see litter and you see natural things being demolished, so I think we have to protect it." [Fleet #5, woman]* *"I worry about our effectiveness to preserve."* She adds, *"We can instill the desire to be in nature." [OMSI #26, woman]*
Renewable energy and energy conservation	2	*"Yeah, I think we need to focus more resources into renewable energy and things like that." [Fleet #19, man]* *"I feel that everyone needs to start changing the way they view things and start helping, like picking up trash and making sure that they turn off their lights, instead of using air conditioning, like open your windows, or if it's cold use sweaters and that kind of stuff." [Fleet #3, girl]*

Fitting in with Nature

Fleet interview participants were asked, *How do you imagine making things that fit in with nature?* OMSI interview participants were asked, *Oftentimes people see technology and nature in opposition to each other. How would you imagine creating technology and infrastructure that fits in with nature?* and *What can we learn from nature when creating things? (buildings, bridges, water supply, transportation, roads).* Participants often described options that already exist, but that could be maximized and expanded upon. For example, 22 participants of 106 identified creating more green spaces in their communities as a way to make "things" that fit in with nature. Table 10 in the next page shows the solutions participants mentioned frequently (six times or more) and the number of mentions.

Table 10. *Responses to "How do you imagine making things that fit in with nature?"*

How to Fit in with Nature	# of mentions (N = 106)
Green spaces	22
Renewable energy	17
Eco-friendly building design	15
Reduce, re-use, recycle	15
Waste and pollution management	13
Natural resources > plastic	11
Cars and transportation	6

Green Spaces
One participant said:

"I bet there's more trees, probably some more rooftop gardens, and more plants. Maybe more green spaces interspersed. Instead of just kind of these blocks, just kind of houses or apartments, yeah, just more green spaces and that are better."

She also described how green spaces would benefit the community environmentally and emotionally:

"I was going to say, that it would actually, probably be brighter because if we worked on that [pollution], there wouldn't be as much smog and chemicals in the air, then the sunlight would get through better, so it would probably be brighter. I bet it would smell better too. I bet everyone would be happier, it would benefit everyone. Including cats." [Fleet #3, girl]

Renewable Energy
One participant described renewable energy as a way to "fit in with nature." However, he also described the challenges in changing a system that "relies" on fossil fuels:

"Yeah, I think we need to get to renewable energy and get away from fossil fuels, but see that's not an easy thing to do. Companies that that's all they do and they don't want to go away and there's a lot of people that are employed by those companies so yeah solar is good, wind is good. Nitro electric." [Fleet #34, man]

A young participant stated:

"I think that there should definitely be less cities and more neighborhoods because light takes energy and power. And cities use lots of that. I think that we'll definitely be able to build more cities if they use leaves to make power." [Fleet #15, girl]

Eco-friendly Building Design

One participant described eco-friendly building design as a way to make buildings that fit in with nature:

"Everything comes from nature. However, like once we start, we get it all synthetic and add all this extra to it. It gets away from nature. So, I think that right now, we're out of tune, but we need to get back into it."

She suggested that:

"Designers, developers, and planners use LEEDS certified buildings, things like that that are going to be, you know, more eco-friendly, using less water, having a smaller carbon footprint." [Fleet #21, woman]

Waste and Pollution

Suggestions to prevent or decrease waste and pollution were widespread and systemic. For example, a young participant argued that we must reduce pollution created by factories:

"Definitely make the factories have less smoke. Try and make it so they don't have any smoke at all."
[Fleet #15, girl]

Cars and Transportation

An adult participant suggested that in order to change the way we commute, our cities must be walkable and communal:

"And to me, in California, we really—well, to the west coast in general—we need to change the way we commute. We need to change the way we live so that things are more central so you can have enough housing and everything else. We just—the west coast wasn't built on a format for community living, really. If you think about any big city in Europe, everything is much more central. You can walk to things. You can—everything else is close by, whereas the west coast is a car-based society and it's not serving us anymore. We have to drive, we have to—people, some people can't get to nature, can't—we just have to bring it into the city, bring it into our consciousness." [Fleet #16, woman]

Personal and Cultural Connections Between the Natural World and Everyday Lives

Participants' relationships to nature vary depending on the geographical location they grew up in and had access to. For example, participants from OMSI shared memories of camping more often than participants from the Fleet Science Center. Participants from the Fleet Science Center shared experiences of going to the beach in San Diego more often. However, hiking is described by participants in San Diego and Portland as a medium to explore, observe plants and animals, and find bodies of water to rest and swim in.

Activities and Experiences in the Natural World

The table below shows activities participants mentioned three or more times in response to the question "What do you like to do in nature?" This table does not include all of the activities participants said they like to do in nature.

Table 11. *Responses to the question, "What do you like to do in nature?" for Fleet Science Center interview participants and "What are your first memories of the natural world?" for OMSI interview participants.*

What to do in Nature	# of mentions (N=106)
Hike and walk	48
Observe animals	21
Observe plants	20
Explore	20
Play	13
Be in water	10
Camp	9
Garden	6
Contemplate	6
Breathe and smell	5
Enjoy nature's noises	5
Fish	3
Climb	3
Bike	3

Hike and Walk

Adult participants described how hiking was used as a strategy to teach youth about the land, plants, and how to remain safe in the natural world:

"I'd say hiking. I used to be a boy scout when I was younger. One of the first things we would always do when we do is go out is go hiking to learn about the area. And they would always teach us about certain plants in the area and the animals in the area to be safe so that's something they kind of instilled in us." [Fleet #27, man]

"I like to hike, walk, get to know the national parks here. Yes, we have a tradition of going out, walking, getting to know and exploring more than anything. Well, every space has specific things from an animal, plant, look for more. We really like to explore and do that." [Fleet #9, woman]

Be in Water
A young participant from San Diego shares:

"Just anything that involves the beach and like, water." [Fleet #20, girl]

Camp
A young participant from Portland describes his excitement:

"When I visited the camp that I was going to go to. There was this river. It was cool to see the river." [OMSI #2, boy]

An adult participant shares her experience camping with the girl scouts:

"Camping, Girl's Scouts from a baby to 14. Nature and the wild. The air quality is nice and fresh." [OMSI #16, woman]

Garden
"And then we also love gardening." [Fleet #21, woman]

Activities in Nature that Require Specialized Equipment (Fish, Climb, Bike, Kayaking)
Activities like fishing, climbing, biking or kayaking, which often require special equipment, may be seen as an occasional opportunity to be in nature:

"If I ever get the opportunity, I like to go fishing. Yeah, kayaking." [Fleet #7, man]

"Mountain bike, though I haven't in years." [Fleet #14, woman]

"I like to just walk around and climb rocks and climb trees." [Fleet #16, girl]

"Going to the river, splashing in the water, playing, huge piece of grass, listen to birds, caught 5 fish." [OMSI #2, child]

Contemplation and Gratitude for Nature (Contemplate, Breathe and smell, Enjoy nature's noises, Observe plants and animals)
Participants often paired hiking with a meditative or observational practice as a means to get away from the city:

"Oh, I like to hike and kind of enjoy the silence or just the sounds of nature, just to be out of the city." [Fleet #3, woman]

Other times participants saw hiking as an adventure with an end goal of arriving at a waterfall or watering hole:

"Hiking. I love a water feature. I like hikes that have a waterfall or a water pool." [Fleet #8, woman]

Hiking was also seen as an opportunity to builds one's relationship with nature:

"I like to look at all the different animals, and try to classify them, like I like to birdwatch and record where squirrels go in my neighborhood." [Fleet # 3, girl]

Evaluators' synthesis statement
Cultivating a space for contemplation and a moment for gratitude in the exhibit with nature's fresh air, smells, and noises could be an opportunity to create an immersive, natural environment.

Observe Plants and Animals
Other times exploring nature is seen as an opportunity to reconnect with loved ones by practicing a less familiar language:

"For me, when I was little, my grandpa used to take me out and show me animals and tell me their names in English and Spanish. And it was really fun to me." [Fleet #16, girl]

Places to Explore the Natural World

Seventy-nine participants identified places they go to in the natural world. Table 11 shows the places that participants mentioned.

Table 12. Responses to the question, "What do you like to do in nature?" for Fleet Science Center interview participants and "What are your first memories of the natural world?" for OMSI interview participants.

Where to Go in Nature	# of mentions (N = 79)
Home	18
Beaches	17
Rivers, lakes, and waterfalls	13
State and National Parks	11
Forest	6
Mountains	5
Trails	5
Nature in the city	3

Home

Participants mentioned enjoying nature at home or in their neighborhoods:

"I like to look around, sometimes when I'm really tired I go in my hammock at my house and I go birdwatching." [Fleet #1, girl]

"I like to bike just out to the school by our house, so I just bike around our house area." [Fleet #7, girl]

"I'd have to say the backyard where we lived. I would play with the bugs and I had this big field in front of the house." [OMSI #8, unknown]

Beach

When talking about the beaches they go to, participants mostly mentioned beaches close to their homes, in California and Oregon. An adult participant shared his family's relationship to the beaches in San Diego:

"You like paddle boarding. Like paddle boarding, boogie boarding, swimming-- Oh, I'm really water-based too. I like swimming in the ocean and we don't like hike-hike, but we like to venture out a little bit. Living in San Diego, there's a lot of places to just walk around and appreciate." [Fleet #20, man]

Another adult participant describes how she enjoys cultivating her senses at the beach:

"If we're talking about nature, water, and sand, and greens. So, if we're at the beach, then I like to enjoy the sea and the sand by really sensing everything." [Fleet #28, woman]

Rivers, Lakes, and Waterfalls

Interview participants often described rivers, lakes, and waterfalls as prized destinations while hiking or camping. Most of the specific places that participants mentioned were close to their homes.

"Dad and me went to nature park at Noble Woods and we saw a river." [OMSI #4, unknown]

"I love a water feature. I like hikes that have a waterfall or a waterpool." [Fleet #8, woman]

State and National Parks

Similar to the beaches, lakes, rivers and waterfalls, the specific state or national parks that participants mentioned were not too far away from California or Oregon. Some examples of places participants had been to in the natural world are Yosemite National Park, Red Rock National Park in Nevada, Silver Falls State Park and John Day Fossil Beds National Monument in Oregon.

An adult participant asks her daughter:

"Remember when we went up the narrows? The Virgin River has cut through the rocks, through the centuries, you have to hike through the river. I love hiking the narrows with her too. I even took you as a baby. Sometimes when you're hiking the water gets really deep."

A woman in the group adds:

"We go to a lot of national parks, but we go out to the sequoias and Yosemite, places like that."
[OMSI #3, women]

Forest
Forests were places where some visitors interact with nature, like this girl:

"I like to go to the woods to find a lot of animals, like worms and owls." [Fleet #18, girl]

Mountains
Visitors mentioned mountains and the experiences they associate with them:

"A mountain and we experienced a storm. Yes, I was scared the first time, but it was the first we had a storm." [Fleet #9, girl]

"I like to climb mountains." [Fleet #2, woman]

Trails
 Some visitors identified specific trails they visit to be in nature:

"I like to hike. Mission Trails is fun, Yosemite is fun. Oh yeah, Joshua Tree." [Fleet #6, girl]

"Hiking over at Cowles Mountain and Mount Soledad." [Fleet #37, man]

Nature in the City
Apart from their own homes and neighborhoods, three participants identified nature in urban areas, mentioning the botanical gardens and pond located in Balboa Park in San Diego and Zoos in the city. A young participant shared that she goes to see nature in Downtown San Diego and Hillcrest, San Diego. The interviewer asked:

"Are there parts of nature in downtown and Hillcrest?"

She responded:

"There's gardens, ponds, lakes." [Fleet #40, girl]

Her father also shares areas in the city that include the natural world:

"Balboa Park. The flowers, the botanical garden, the pond." [Fleet #40, man]

Promising Narratives to Empower Girls and their Families to Engage in Exhibit-based Experiences Regarding Sustainable Engineering

At the conclusion of the interview, after answering the questions outlined in the preceding sections of this report, participants were asked what they would like to see in the exhibit. Their exhibit ideas are informed by the previous questions about the importance of sustainability. Therefore, many of the exhibit ideas are related to building healthier and more sustainable communities in order to catalyze community members to become more involved in the betterment of animal life, society, and infrastructure.

Table 13. *Responses to "What would you like to see in this exhibit?"*

Most Frequently Discussed Exhibit Ideas	# of mentions (*N* = 94)
Simulation and reality	17
Reduce, re-use, recycle	14
Innovative, interactive, and creative	12
Farming and gardening	11
Sustainable building and neighborhood design	5
Animal habitats	4

Note: Less frequently discussed exhibit ideas (with three mentions or less) are not included

Simulation and Reality
Participants wanted to see a simulation of what would happen if actions are taken to prevent environmental degradation.

"I'd like to see what we're doing to the world and what the world could be like if we didn't do these things." [Fleet #6, girl]

An adult participant shared that she wants to see an exhibit like the Holocaust Museum that will be captivating to visitors:

"I think that we need to have them walk through exhibits that… maybe how the Earth was before and how it could be and what could be, how to experience, Armageddon. And just make it very realistic."

She adds:

"I think the most compelling exhibits are the ones where people really… Like the Holocaust Museum. Because I think a lot of people want to not think about it or don't think that you do have an impact, or you can't make a difference." [Fleet #14, woman]

An adult participant suggested that virtual reality that allows visitors to envision a green future could catalyze people to participate in action:

"The ability to maybe put on some 3D glasses and fly around, have the ability to control your way through a green world and just see it for yourself. I think if somebody actually does that and sees what the future COULD be, then it'd put that in the back of people's minds, say, "Hey man, we should probably do that. We could probably do that." Most people, until they see it, they can't really picture it in their own minds. So I think that's really important. Just the VR thing would be great."

He added:

"Pictures, maybe a movie of some type, display potential materials they would be using. You know, small models. [Be]cause at the same time with an exhibit like that, you're kind of planting a seed in people's minds." [Fleet #22, man]

A young participant stated:

"I think if it was more realistic people wouldn't want to go to it, like it's too scary. You know, like 'oh I'm scared of that. I don't want to see that happen. I don't want to go.'" [Fleet #40, girl]

An adult participant reported that she would like to see innovation to enhance the future so that youth can envision ways to take part in the future:

"I guess some of the innovations that we could see real-time that have been put in place currently, and then kind of ideas on how to enhance that in the future. And then the avenues of how that could be achieved...And so then kids can, depending on the age of these kids, they can really find a way of taking part in that, versus … I mean, there's some things like "oh, make a worm bin" and "compost," but something that when they get to a certain age, maybe they want more hands-on or really take an active part of that." [Fleet #3, woman]

> **Evaluators' synthesis statement**
> Ultimately, participants who are interested in seeing a simulation of the past, present, and/or future or a realistic perspective of this particular historical moment, hope to encourage people to feel like they can make a difference and see themselves as agents of change.

Reduce, Re-use, and Recycle
Interview participants shared diverse perspectives on the critiques and importance of reducing, re-using, and recycling products.

A participant asked:

"Oh, if I recycle, what difference is that going to make?" He adds, *"Present it to people, you know, present small things that could make big changes. I think that would encourage people to start taking action."* [Fleet #19, man]

An adult participant shares his critiques of the recycle and reclaim trend:

"Because you want to use materials that will withstand time, right? But, at the same time you'd like them to be able to break down and be biodegradable and, or repurposed. The whole repurpose thing to me it is very delicate, you know, walking down the edge of a sword because plastic can be repurposed, right? But it also never goes away. Because recycling and reclaimed use of things became a fad. And everybody like "Oh, my $7000 sofa is made of recycled materials. And "I bought this." So, "this whole thing is reclaimed." Yeah, but you already had a sofa that worked. And you chucked into the landfill and you have this all-natural thing. It defeats the purpose." [Fleet # 6, man]

An adult participant suggests developing an exhibit component that explains the life cycle of a product:

"Just to have an exhibit that shows the life cycle of a product because everything we use, if we harnessed its life cycle, we wouldn't have the waste we have now. Driving past a landfill, it's a sad thing, it's just not necessary. As it currently is. And more learning about that for our kids and that's what the first people did, use things from nature, being able to utilize that for engineering, and say 'how can we use that on a larger scale?' But still thinking about its production cycle. We can't talk about how great it would be to mimic something if we're doing it in a synthetic way that then creates waste that could be dangerous and toxic. We've done that before and we've got to be super careful with that." [OMSI #30, woman]

Innovative, Interactive, and Creative
Interview participants emphasized the importance of creating an innovative, interactive, and creative exhibit that encourages youth and families to engage with sustainability through design, as well as examining the process behind production and design:

"I think the interactiveness is fun, you know, to be able to wash your hands with the soap and it smells like lavender or whatever that has the oils, or just see the difference between two things. Modeling that, you know, this Play Doh will be gone in 300 days, and this one will be here for 300 years" She added, *"I think just showing the amount of options that are available, you know? Right now, the different types of straws you can get, different types of forks you can get. Just seeing that there is choice and don't always go with the first thing you see."* [Fleet #38, woman]

"It teaches you about something. 'Cause I love to just play games and what I think about is maybe make like a little clip of something and I kind of design something to be eco-friendly, using only eco-friendly materials." [Fleet #22, girl]

Farming and Gardening
Incorporating a community garden and learning how to cultivate food was offered by several participants as a way to learn how to "fit in with nature" within the exhibit:

"Like a living wall? Plants and succulents. Or even showing how like urban garden[s], in the city, show people how you can actually like an indoor garden, herbs, things like that. 'Cause gardening is just so important to me. So for teaching people and having an exhibit about how you can garden within the home in a small space." [Fleet #21, woman]

"Gardening stuff. Utilizing your land. How to plant tomatoes or plant something that you're going to eventually eat or live off of. I think that would be cool. Planting trees. Stuff that's going to help the environment where you live. Bring more nature to your area." [Fleet #27, woman]

"Maybe you can have it where they can create their own ecosystem and maybe infrastructures on what they can do and how they can have something done differently. I would put a community garden right here or I would do this kind of thing, a little bit like the exhibit earlier. Like you design your own medical device, your own kind of thing." [Fleet #37, woman]

Sustainable Building and Neighborhood Design

Five interview participants reported that teaching sustainable building and neighborhood design through the exhibit would be a way to explore and imagine sustainability.

"Maybe an idea on how to re-design, like re-design your neighborhood to be more eco-friendly, cause some kids are interested in that, like me. More than pressing a button. Designing." [Fleet #3, woman]

"Maybe how each individual can be self-sustaining in the habitat like compost, to growing veggies, to maybe have a replica of a most sustained household? At San Francisco's museum we went to last year they had a grocery store, [a] restaurant, and they had a perfect, balanced 1600 calorie meal. They had to keep putting it together and you pass it, all the ingredients are in place. You had the calcium, vitamins, dairy. So scenarios of if a house doesn't have a compost or if it does have a compost or a solar panel, no you have to have a solar panel to produce your own electricity. And maybe you can design your own dream home from the perspective of sustainability. I like that." She added, *"And you can have a scoring system or you know, 'who built the most sustaining house or lifestyle?' (…) or 'here's your work, here's your house' or 'here's the options for houses, which one would you choose?' And do you bike to work or do you walk to work. Or take public transit and have a suburban job."* [Fleet #30, woman]

"Ants are pretty fascinating, a lot of people don't like ants, they're the little worker bee of the ground, they're actually pretty intelligent. We could learn architecturally from them, they have flood zones. I just don't think enough research has been done on ants." [OMSI #28, unknown]

"Honey bees, with the hexagon. I've seen people incorporating it into their house. It makes the base and the foundation incredibly strong." [OMSI #28, unknown]

Animal Habitats

Four interview participants expressed an interest in rebuilding and protecting animal habitats. This young participant expresses her desire to understand how engineers have contributed to the destruction of animal habitats and how to use engineering as a tool to remedy the damage:

"I want to see how or where. Sometimes engineers destroy. We should let people know that we're destroying habitats and maybe what things we can do to help. I think if it's done right and it [engineering and technology] is sometimes, it wouldn't affect people and animals. But I don't know what we could do, what type of buildings and electronics we could use. Then it would be like telling people to stop doing what they're doing already, (…) America is very dependent on technology, to tell people to stop is hard. We already have irrigation. I don't know what stuff we already have. I want to help re-build habitats. Plant those trees back, grow food that those animals eat." [OMSI #24, girl]

Part 2: Results of Focus Groups with Girls

Summary: Results of Focus Groups with Girls

Part 2 of this report is a description of the results of the focus groups with girls conducted in Oregon and California. For the readers' convenience, this brief summary of findings is provided before the more detailed results below.

Personally Relevant Sustainability Challenges

One of the evaluation questions guiding this study is *What are the sustainability challenges that girls and their families find personally relevant?* Focus group participants from Adelante Mujeres after-school programming held the strongest interest in *Peace, justice and violence-free society* and *Everyone has healthcare* when choosing from a list of community-related sustainability goals. In terms of environmental goals, more than half of the girls expressed interest in *Fresh water and sanitation facilities are accessible in all countries.* The girls chose *abundance of food, water, shelter, and clothing* most frequently from a list of economic goals.

Focus group participants from San Diego were asked to rank a merged list of sustainability goals. *Waste and pollution management*, *Climate action*, and *Plants and animal life thrive* were, on average, the highest-ranking goals for the girls in that activity. When asked what issues the San Diego focus group participants considered the most important in their community, responses revolved around affordable housing, gentrification, and homelessness, as well as gender justice and reproductive rights. They expressed the most concern for climate change and pollution when asked about the future of the environment.

Personal and Cultural Connections to the Natural World

Another guiding evaluation question is *What personal and cultural connections do girls and their families perceive between the natural world and their lives?* Focus group participants from Adelante Mujeres after-school programming expressed an interest in centering the needs of people who are low-income and who live in "developing" or "third world" countries. Focus group participants in San Diego expressed an interest in the connection to the land through migration stories, ownership and access to land, cultivating the land for food, and spiritual connections to the land and ancestors.

Promising Narratives to Empower Girls and their Families to Engage in Exhibit-based Experiences Regarding Sustainable Engineering

To the evaluation question *What are promising narratives to empower girls and their families to engage in exhibit-based experiences regarding sustainable engineering?*, focus group participants from San Diego expressed an interest in an intergenerational and inter-species story that represented a realistic or fantasy relationship between a young girl (9–14) or a young adult and her elder. They envisioned this elder to be a human, animal, or tree that has been present to experience and witness the harm caused by human design and infrastructure to the natural world and who holds the knowledge and wisdom to guide them to solutions for a sustainable future. The girls imagined a city that merges with the natural world that is both environmentally and socially conscious and incorporates elements of the natural world.

Full Results of Focus Groups

The results presented in this part of the report indicate if the data were gathered at the focus groups with Adelante Mujeres in Oregon, at one of the two focus groups in San Diego, or in both locations in California.

Personally Relevant Sustainability Challenges

Sustainability Goals Sorting Activity

Similar to the interviews conducted at OMSI and the Fleet, the focus groups included activities that asked the participating girls to rank sustainability goals in order of importance and explain their reasoning. The focus groups conducted with Adelante Mujeres were carried out earlier than the focus groups in San Diego, and used different terms for the sustainability goals. The process for the sustainability goals is described on pages 5-6. Appendices J, K, L, M, N, and O show the instruments used in the focus groups.

Focus Groups with Adelante Mujeres

This section presents the results of two focus groups, which included eight participants between the ages of 9 and 11 in the first group and seven participants between the ages of 12 and 14 in the second, for a total of 15 participants. Participants are girls who are enrolled in Adelante Mujeres' Chicas after-school program, and the focus groups were conducted at the girls' schools in the Portland metropolitan area. As stated at the beginning of this report, pseudonyms are used to protect the confidentiality of the participants.

The first focus group study started with a welcome and an icebreaker on what engineering is. After broadly explaining the purpose and contents of the activities, the participants were asked to engage in a story-telling activity. Girls were to pick a goal from each one of three lists of sustainability goals. The lists had community, environmental, and economic goals. Appendix J details the duration and detailed contents for each activity, as well as the instructions for the data collectors.

The second focus group was similar to the first, with some variations. Besides choosing a place from the natural world where the story would take place, girls were given a world map and asked to talk about their current location and the place their ancestors were from. The participants were asked to pick a geographical region in the map where they would like their story to be developed and given time and supplies to write or draw their story. Some of the wording for the sustainability challenges was modified to improve understanding and readability.

The results presented here are divided into the categories of sustainability presented to the girls: **Community**, **Environment**, and **Economy**.

COMMUNITY

Table 14 below shows the "Community" sustainability goals and which ones were chosen by the girls. The top two goals that were selected by the girls are discussed in this subsection.

Table 14: *Youth Responses to Community Goals for Sustainability*

Community	Amount (N = 15)
Peace, justice and violence-free society	6
Everyone has healthcare	6
Quality education	2
Harmony among all countries	1
There are leaders of all genders everywhere	0
Farms, forestry, and fisheries provide nutritious food	0

Peace, Justice, and Violence-Free Society

Six of the 15 girls identified *Peace, Justice, and a Violence-Free Society* as a sustainability goal that is personally relevant to their lives. When the girls were asked to be more specific about the types of violence that their communities experience, they identified race-based discrimination, xenophobia, deportation, police violence, and gun violence as issues they had personally encountered or witnessed. Zoey, age 11, shared her thoughts on racism and deportation:

"People get hurt because of their race and I don't think that's fair. People are getting kicked out of the country."

Although Zoey was the only participant who mentioned racism and deportation, most of the girls agreed with Zoey's statement that deportation is harmful to our communities and our families. When asked what kind of violence affects the community, Sofía stated:

"Police officers, shootings in schools."

Similarly, Yetzali, age 12, stated:

"There is a lot of school shootings, people are scared."

On a slightly different note, Susana shared that

"There is not much peace in the world nowadays."

The evaluators observed that the girls shared examples of systemic violence instituted by the United States government upon immigrant communities and violence perpetrated by police and fellow students in schools.

Everyone has Access to Healthcare

Six girls identified access to healthcare as a personally relevant sustainability goal. Their reasoning for selecting healthcare had much to do with their belief that access to healthcare is a right that contributes to freedom and liberation for their communities. Vanessa, age 10, asserted:

"If they don't have healthcare they won't be able to live their free life and they won't have time to do what they want to do. Everyone should be healthy."

Additionally, Eleidy stated:

"Everybody deserves health."

There was great focus on healthcare and a large agreement across the room that healthcare should be accessible to everyone, even though not everyone chose this sustainability goal.

ENVIRONMENT

Table 15 below shows the "Environment" sustainability goals and which ones were chosen by the girls. The goals that were selected by three or more girls are discussed in this subsection.

Table 15. *Youth Responses to Sustainability Goals for Environment*

Environment	Amount (N = 15)
Fresh water and sanitation facilities are accessible in all countries	8
Animals and plant life thrive on the land	3
Al countries use clean energy	2
The planet has balanced ecosystems	1
Animal and plant life thrive underwater	1
Cities prosper in harmony with the natural world	0

Fresh Water Ecosystems and Sanitation Facilities are Accessible in all Countries

Eight girls identified access to fresh water ecosystems and sanitation facilities as a sustainability goal that is essential to the well-being of their communities. Vanessa, age 10, echoed the notion that healthy communities must have access to clean water when explaining:

"If they don't have healthy water…like in the community one, they need to stay healthy."

Meanwhile, Rosa spoke of communities that lack access to water:

"In other places they don't have water."

Animals and Plant Life Thrive on Land

Alisha, age 9, expressed,

"I want animals to do well because they are like humans."

ECONOMY

Table 16 in the next page shows the "Economy" sustainability goals and which ones were chosen by the girls. The goals that were selected by three or more girls are discussed in this subsection.

Table 16: *Youth Responses to Sustainability Goals for Economy*

Economic	Amount (N = 15)
There is an abundance of food, water, clothing, and shelter for everyone	8
Living wages and safe working conditions that contribute to economic growth	4
Companies reduce waste and pollution	3
Buildings, roads, and transportation are reliable	0

There is Food, Water, Clothing, and Shelter for Everyone

Eight girls identified food, water, clothing, and shelter as essential needs for a healthy community. Beatriz, age 9, conceived of access to water and clothing as a matter of survival:

"Some people don't have water and they can die, and they can die because of water that is polluted and stuff. Some don't have clothes that make them warm."

On the issue of housing, Christina stated:

"Some people live on the streets, they don't have shelter."

The discussion in both focus groups addressed poverty and homelessness. Homelessness seemed like an issue that resonated with participants because of the housing crisis in Portland and potentially elsewhere in the United States. The girls often purposely identified places based on their perceived understanding of countries or continents that are under-resourced and experience poverty. (See section on "Promising Narratives" for more context).

Living Wages and Safe Working Conditions that Contribute to Economic Growth

Four girls selected *living wages and safe working conditions that contribute to economic growth* as a sustainability goal that is personally relevant to them. Yetzali, age 12, shared a personal story with the group:

"My dad, my uncle, because of our race we get paid less. My dad does roofing. Both [of] my uncles work with them. They shut down the company. My dad was working there for 10 years. He doesn't get paid as much as others, like $25 per hour because of our race. Other people get $45, $50."

Although the girls are not old enough to personally experience racism in the workplace, their families and communities are affected by racism, pay inequity, and wage theft. Not only does racism in the workplace affect their community's access to economic prosperity, it also teaches them a lesson in how they will expect to be treated once they enter the workforce[1].

Companies Reduce Waste and Pollution they Produce

Zoey, age 11, explains how she believes companies contributes to waste, pollution, and cause climate change:

"Pollution is one of the things that cause global warming and that is something really powerful and it can be bad to animals and their habitat and to us too, and it can also affect the weather. I think companies should just reduce them because it's important."

Focus Groups in San Diego

This section discusses the results of the two focus groups conducted in San Diego, with 24 participants from Be WiSE STEM programming for girls at the Fleet Science Center and the Barrio Logan College Institute after-school program for girls.

The third and fourth focus group shared the same structure. At the beginning of the study, participants were informed about its purpose. An icebreaker followed about the participants' favorite thing to do in nature. Then, girls were asked to engage in an Ancestor and Landscape visualization activity, in which they reflected on the landscape of their ancestors and its relationship to their own lives. After the visualization, girls were asked to talk about their feelings toward the environment and issues in their community. Following the questions, participants were asked to rank 11 sustainability goals from the most to the least important and explain why. The sustainability goals were not divided into "community," "environment," and "economy."

The study ended with the *Imagine and Design your Ideal World* activity, in which girls were encouraged to write or draw a story about an ideal world. Appendix N details contents for each activity.

The Sustainability Goals used for the sorting activity with the San Diego activity are the same as those used in the Fleet interviews (see pages 5-6 for an explanation on how they were developed). Table 17 shows the average rank that girls gave to each sustainability goal. The position of each sustainability goal in the importance ranking (first, second, third...) for every respondent was used to calculate that average rank.

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[1]Latinas in the United States are typically paid 53 cents for every dollar paid to white men (Hegewisch & Williams-Baron, 2018). Latinas are overrepresented in low-paying service industry jobs and make up just 1 percent of jobs in engineering and computing, which are the two highest-paying STEM fields (American Association of University Women, 2015, 2018).

Table 17: Respondents' average ranking of 11 sustainability goals from focus groups.

Sustainability Goals	Average Rank
Waste and pollution management	3.60
Climate action	3.92
Plants and animal life thrive	5.04
Access to clean water	5.17
Affordable and healthy food	5.38
Anti-violence	6.38
Healthcare for all	6.71
Immigration rights	7.08
Quality education	7.25
Affordable housing	7.38
Safe work and fair pay	8.00

Waste and Pollution Management, Climate Action, and Plants and Animals Thrive

In the San Diego focus groups, environmental issues ranked highest on average. Similar to the interviews, the term *sustainability* is often viewed as environmentally-leaning. Girls often viewed climate action as a way of advancing other environmental issues, like reducing waste and pollution, providing access to clean water, and protecting plants and animals. Girls were asked to describe their rationale behind their ranking:

"First was Waste and Pollution Management and second was Climate Action, cause if you control climate and pollution, it's at a level and it cannot affect us as much. Number 3 is Plant and Animal Life Thrive because after we have a good planet they can grow in peace. My fourth is Water, and as you can see it goes on and on." – Daniela

"[Climate Action] if we have no world the others don't make sense, so save the world first." [BLCI, #8]

"I chose Waste and Pollution Management cause if we can stop that it can help other things. For number 2, I chose Climate Action." – Sophia

"First Climate Action 'cause without the planet none of us will be here, second Waste and Pollution Management 'cause we need the planet to be healthy first." – Tabatha

"First I put Waste and Pollution Management because there's trash everywhere. For the second one I put Affordable and Healthy Food because people can get sick." – Kloe

"First I did Climate Action cause it's a really important problem, by 2050 the majority of the glaciers are going to be affected." – Cynthia

"For the first one I put Climate Action, 2 is Immigration Rights, it's horrible what's happening with families." – Aria

"The first one I chose is Quality Education, because if we have education it's easier to communicate all around, which will help. Number two is Climate Action because that affects our food sources, the area we live in. If we fix the climate we fix other issues, it's like a domino effect." – Ariana

Evaluators' synthesis statement
The exhibit team could consider exploring how engineering can be a tool to advance sustainability in a holistic way.

Anti-violence, Healthcare for All, Quality Education, Affordable Housing, and Safe Work and Fair Pay

Social and economic issues were generally less prioritized in listing. However, this does not mean that girls find these issues unimportant. Often, they justified listing them last because they felt that if we did not have a planet to live on as a result of climate change, waste, and pollution, we would not be able to address social and economic issues. Nonetheless, some girls expressed how resources like affordable housing, healthcare for all, and anti-violence contribute to a quality education and socially just education systems.

"Number 7 was Anti-violence because it's important because of school shootings, fights, and so on. Our world needs to be more peaceful." – Daniela

"I chose Anti-violence and Healthcare for All. We have to help the environment first. For these two I believe if we fix ourselves psychologically, we can fix other issues." – Ariana

"For number 11 I put Affordable Housing. If we don't have a place to live we can't fix other things." – Aria

"8 is Quality Education cause after Anti-violence students can focus more on work than on safety, after it's a safe place they have a place to work at. 10 is Fair pay because if everyone gets the same money, then they can afford housing and healthy food. Everything has an effect on one another." – Daniela

Minoritized communities, and Latina girls and their families in particular, are disproportionately affected by interpersonal and structural violence, rising housing and healthcare costs, anti-immigrant policies, deportation, and family separation, and unfair and unequal salaries. These are issues that inevitably affect the professions young girls choose, the barriers they experience while navigating the education system, how they show up for their communities, and the tools and skills they have access to and utilize for the benefit of themselves, their families, and the world.

Evaluators' synthesis statement
Designing our Tomorrow: Mobilizing the Next Generation of Engineers must take into account how climate change, waste and pollution, access to water and food, and plant and animal life will affect the lives of girls and how they imagine their futures. In addition to these environmental factors, it must demonstrate how systems of oppression impact how girls engineer for a holistically sustainable future.

Community Issues (San Diego Focus Groups)

The following issues were identified inductively through analysis of focus group participants' open-ended responses to the question, *What community issues are important to you?* The participants' responses were grouped into the following themes:

Affordable Housing, Gentrification, and Homelessness
The girls gave concrete examples of housing issues that they had witnessed:

"I was watching the news and they said that in City Heights and Old Town the rents were going up, they say they were already 2000 and here it's the most expensive place." – Kayla

"It's homelessness, because any street I come by I see those little tents they set up. I'm not sure why they ended up being on the streets. My mom is always saying they want money to buy cigarettes and stuff but people want food and a better life. Here we have a little area for them and it gets packed. I think there should be more areas like that." – Daniela

"Gentrification. Our area, Barrio Logan, there used to be a lot of Mexicans, we moved to an apartment. I remember my parents saying there was a whole market, it's changed and where are we going to go?" – Willow

Gender Justice and Reproductive Rights
Although not prompted to talk about gender and reproductive justice, participants demonstrated an interest for these topics:

"The other is women's rights. In my school they banned skirts. And some moms would say that's discriminating because they are girls so they are [should be] allowed to use skirts because they like them." – Kayla

"The second topic is women's rights. It's like we [girls] have more rights but the payment, the job, if they have the same job the women are paid less. I don't understand why, because we are female or not strong? Banning abortions, apparently that kinda comes into women rights, because women had no say because men are not getting pregnant. They say women should decide, because women are giving birth." – Daniela

"Sexual harassment. It also happens to guys, but a lot to girls. My school told us how to stop and skirts also, I kind of agree with no skirts and skirts." – Willow

One girl was in disagreement about access to abortions:

"About abortion I think the opposite because people say when you kill other people they sentence you, so why would you kill a baby that doesn't have the fault of being born, you can give him for adoption to let him live." – Kayla

Anti-Blackness
As in the Oregon focus groups, racism came up as an issue the community had to deal with:

"Sometimes people are mean to black people." – Kim

Gun Violence

Some girls expected gun violence in their schools or experienced shootings in their vicinity:

"The first is not going on in our state, it's school shootings, because those keep popping up. Some places it's hard to get guns, but other places you just need to have no criminal record and that's all. But it's the kids. I looked into it, and out of every school shooting that I've seen the kids had mental problems. They were bullied or something. I'm scared that it might happen to me. That happened in elementary, we went into a lockdown because someone shot fire. No one got hurt but it scared me, that's what made me interested into that stuff to be prepared for it." – Daniela

"There's a synagogue near my house and recently there was a shooting." – Kim

Smoking, Vaping, and Substance Use

Participants were familiar with drug use and largely commented on vaping in the school:

"I have a best friend in school that will tell me "in my school girls are smoking or vaping" and I'm like "why don't you say anything?" and also every time they talk about that I'm like "why are you proud of it? This is serious."—Kayla

"My brother is in a very young age. I'm in elementary school and I hear one of my friend's vapes, and I'm like "how?" I always thought I would never get into that but you never know really."—Cameron

"In my neighborhood there's an increase in drug needles, that's very common in our area." – Kloe

The Environment and Concern for the Future (San Diego Focus Groups)

Focus group participants from BLCI and BE WiSE were asked, *What are your feelings about the environment and the future?* As a result, the girls identified the following issues as important to them:

Climate Change

The girls expressed concern about climate change and about the consequences of not taking action:

"When I think about nature it's beautiful and that but not everyone can see it because there is climate change and it's like crazy… People say: "Ohhh we might move to Mars and stuff" but why is that? I don't see the point of that, why don't we learn from mistakes, because right now because of gasoline and stuff it's getting expensive and that's a great possibility for more energy types, so instead of fossil fuels it's like water energy and solar energy…To be honest, time is running out, we don't have forever, and I'm starting to see that there is not really a future for nature 'cause everyone talks about it but most people don't do anything. I don't see a possible resource so our nature gets better 'cause it's the same thing all over again." – Daniela

"Climate change, how there's so much plastic in the ocean and if we don't stop now." – Willow

Pollution

Some participants identified the harm that pollution caused on natural elements:

"People say we have a big chunk of trash in the ocean, we talk about it but we don't do anything." – Kayla

"Sometimes smoke comes out and it adds to the air." – Sandra

Wildlife Habitats Destroyed

Loss of habitat was an issue that the girls either feared or experienced:

"It's scary, like we don't have a Planet B. We choose to make this privilege life and it's like losing. The animals, they can become extinct, I know for other people in the future, they won't be able to see the animals because they are endangered or pollution or hunting." – Jamie

"There used to be a lot of wildlife like coyotes and rabbits. Because we're there they have to come out." – Kloe

Personal and Cultural Connections to the Natural World

According to focus group participants, defining an individual or community's relationship to the land and geography is influenced by migration, cultivating and growing food, access to land ownership, and spiritual meaning imbued in the land. Forty percent of all focus group participants expressed that they are immigrants or the children of immigrants. The actual percentage could be higher because participants were not explicitly asked to share their families' migration stories.

Ancestors and Landscape (San Diego Focus Groups)

Focus group participants from BLCI and Be WiSE were asked to participate in an ancestor and landscape visualization activity: They were encouraged to close their eyes to visualize the land where their ancestors and/or family members lived, as far back as they could remember or imagine.

Migration

Six of twenty-six focus group participants mentioned that their ancestors and/or families migrated from countries like Mexico, Italy, Turkey, Greece, Spain, France, and the Philippines to the United States.

"I remember my father telling us our tribe, los Aztecas [the Aztecs]. I am from Michoacán so a lot of mountains. The heat is really bad. My mom is from the city, I've been to the city, but no grass or trees." – Willow

"My great grandfather was from Italy so I eat pasta a lot." – Sophia

"My dad is from Turkey and he talks about how his grandpa is from Greece and he says they moved because of Russia. I've been to Turkey a few times." – Aria

"My family came from Spain and moved to France. My father moved to Mexico and came to the United States." – Kari

"My family is from the Philippines and they moved here, to the United States." – Kloe

"My parents came from Mexico and the place both of my parents are from are deserts." – Hope

Growing Your Own Food

At least one-third of focus group participants in San Diego expressed that they are immigrants or children of immigrants. Two of twenty-six focus group participants said that their families in Mexico actively participated in growing their own food and still do to this day.

"I thought of agriculture because the town where my family comes from, they grow strawberries and blueberries and raspberries…Guadalajara [where family is from]." – Jamie

"I also thought of agriculture, not sure if my grand-grandparents had it worse or better cause my grandparents have it better now." – Daniela

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Evaluators' synthesis statement

Children of immigrants often depend on their parents' memory and story-telling abilities to learn about culture, spirituality, ancestors, and their family's relationship to the land. In order to develop an exhibit that is personally and culturally relevant to immigrant children, museums can make the effort to incorporate stories of migration, multiculturalism, and spirituality as it relates to connecting to the land and natural world.

Locations (Adelante Mujeres Focus Groups)

Participants were asked to select a city, state, or country where they would want to achieve the sustainability goals they selected. The evaluators reminded them that they wanted to hear about an ecosystem and location that mattered to them. During the first focus group, participants were not provided with a world map and were not asked where their families/ancestors have lived. The girls in the second focus group all had family who lived in and still live in Mexico. Therefore, it is possible that girls in the second focus group selected Mexico more frequently because they felt more inclined and encouraged to draw personal connections to their families.

Table 18: Youth responses to locations

Place	# of mentions (N = 15)
Africa	5
Mexico	4
United States	4
California	1
New York	1
Georgia	1
Impoverished Places	2

Africa

Five of 15 participants suggested that the entire continent of Africa is a place that is under-resourced, in comparison to the rest of the world. Zoey, age 11, articulated that:

"It's a place where some people are really suffering. They have little water, little food."

Although each of the girls was asked to identify a country or a city in Africa, most of them stated that they wanted to encompass the entire content of Africa because they viewed Africa as a whole as under-resourced in terms of water and food. This indicates that there is a sense that Africa as an "underdeveloped" region that needs "help" from "developed countries," a stereotype that can be challenged in the exhibit.

Mexico

Four of 15 girls chose Mexico as the location where they would like to see their sustainability goals achieved. Many of the girls mentioned that they were from Mexico and had family members who migrated from Mexico to Oregon. In fact, Yetzali, age 12, explained that her father had shared stories about his experiences in Puebla, Mexico:

"I choose prairie and Mexico and it would probably be Puebla because my dad told me it's messed up there. The plants wouldn't grow. He would try to plant food and nothing would grow there."

United States

Three of 15 participants indicated that the United States is a location where they would like to see their sustainability goals implemented. While the focus on sustainability goals in Africa was on alleviating

poverty and being under resourced, the participants focused on pollution and environmental damage in the United States. Teresa, age 11, shared why she selected the United States:

"The US because of the pollution, it's affecting the oceans."

Evaluators' synthesis statement

Individual memory, familial and communal stories and/or narratives, and national consciousness have an impact on how girls assign meaning to geographical locations and their specific sustainability issues. Indeed, in this exhibit, geographical location matters when determining and examining sustainability issues, representing innovation in STEM, and challenging westernized countries' impulse to "save" the "third world" and apply a deficit perspective to low income, immigrant, and communities of color in the United States. Representing cross-cultural innovation could transform how engineers and communities design for a sustainable future.

Promising Narratives to Empower Girls and their Families to Engage in Exhibit-based Experiences Regarding Sustainable Engineering

Ideal World Activity (San Diego Focus Group)

Twenty-four focus group participants from the Barrio Logan College Institute (BLCI) and the Fleet Science Center's Be WiSE after-school programming participated in the Ideal World Activity, in which they were asked to describe a person, animal, or non-living character to tell the story of their "Ideal World." Participants were also asked to describe a city that fits in with the natural world and create community agreements to go along with their city.

Identity (Human and non-human beings)

The focus group participants often described a story that displayed an intergenerational relationship between a young girl and an old animal or plant, which has witnessed and undergone years of environmental destruction. This person, animal, or plant aims to educate young people on environmental injustices and create solutions. For example, a participant identifies a redwood as a story-teller who solves problems:

"The story teller is also a redwood because they are very big, strong. In my story the tree is a person who solves things. It's in the past 'cause I feel there's more wildlife, less buildings. […] I always wanted to do that, go in the forest. It tells people it has seen things; it gives advice to people." – Madison

Most importantly, participants want the story-teller to be someone who has witnessed, experienced, and understands the impact humans have made on the earth:

"My story-teller is someone that just turned into an adult, in the early 20s, they experience before and after the utopia so people would know how they got there." – Ariana

Age

Focus group participants often related to story-tellers close to their age (9–14) or 10 to 15 years older than them. However, they also valued the knowledge and wisdom from plant, animal, and human elders in their imaginary story. An intergenerational narrative that portrays a relationship between a young girl and an elder that has experienced the harm inflicted on the natural world and seeks to educate young people to develop solutions, could apply to the project's goal of using nature as a mentor, model, and measure to solve the world's problems.

Time

About half of the participants mostly set their story in the future. Note that one participant did not answer this question. One girl chose both past and future.

Past (7)
"Past, because there was less problems." – Carolina

Present (5)
"It takes place in the present because changing things now is the only we can do." – Tabatha

Future (13)

"This takes place in the future, it would be like here but without pollution." – Daniela

"It takes place in the future 'cause we learn from the past." – Willow

"For the time I chose the future because we have many ideas of what the future can look like and one is all technology, flying cars. Another feature is our place turning to a wasteland." – Kloe

A List of Community Agreements from Girls

Participants from the BLCI and Fleet Science Center focus groups were asked to envision a city that fits in with nature and to identify one or more community agreements to apply to the city they designed. The evaluator coded for important issues, ideas, and values the participants described through designing their cities and identifying community agreements. Table 19 below displays a grouped list of demands with issues, ideas, and values from all 24 participants.

Table 19. *Community agreements*

Honor and Respect Mother Nature	Reduce Waste and Pollution	Equitable and Accessible Resources for All	Human Rights
‣ Learn from your mistakes, be aware of your impact on the environment, and do your part to help the environment ‣ If you take something, you must give back to the natural world and/or community ‣ Communicate with plants and animals and value nature's wisdom ‣ Keep rivers, lakes, and oceans clean ‣ End excessive hunting and protect endangered species ‣ Respect all living and non-living things on earth ‣ Plant your own food ‣ End climate change ‣ Design cities that are connected to the natural world ‣ Enjoy the natural world	‣ Keep rivers, lakes, and oceans clean ‣ No industrial sites ‣ Close the streets for 3 days to reduce pollution and promote a healthier lifestyle ‣ Reduce CO_2 emissions ‣ Plant more trees ‣ Do not litter ‣ Recycle ‣ Use biodegradable and reusable products ‣ Reduce plastic waste to make plastic packaging obsolete ‣ Replace fossils fuels with alternative energy sources	‣ The community shares food and water so everyone has access despite income or wealth ‣ Housing for all ‣ Healthcare for all ‣ Clean water for all ‣ Leadership is a community effort ‣ Accessible transportation system ‣ Equity in our businesses	‣ Immigrants are welcome, no human is illegal ‣ Prevent and intervene in violence ‣ Guns are illegal/very restricted ‣ Get rid of money; trade or make materials ‣ The death penalty does not exist ‣ People are free and happy ‣ All voices and perspectives are heard

This list of community agreements could inform the *Designing our Tomorrow* project team's conversations around transforming the field of engineering to challenge the assumption that STEM is an objective field, free of traditional values. The project team would benefit from assessing how the field of engineering has participated in honoring and respecting the natural world and encouraged a relationship to the natural world, as well as how it has contributed to the reduction of waste and pollution, ensured resources are equitable and accessible to everyone, and lastly, how the field has prioritized profit over people.

Resistance to Imagining an Ideal World

Focus group participants had the opportunity to imagine a city that fits in with the natural world. However, one focus group participant commented that she did not want to create an ideal, perfect, or utopian world: She explicitly chose not to design a city that merges with the natural world. She responded to the activity:

"I don't want to have a perfect world; my perfect world is living here. A perfect world is boring; you wouldn't learn anything. In this world you learn from your mistakes. I would never change my world because I just love it." [BLCI, #4]

City and Natural World

Most participants envisioned an environmentally and socially conscious city:

"A city where we are connected to nature, solar panels, wind and water energy, and no pollution. Everyone is treated equally and equity for people's necessities. We are all united and oceans are cleanest they can be. Animals aren't endangered and everyone is respected." – Willow

"A city with no pollution and no violence. Everyone helped each other. No one would be homeless and no one would litter on the grounds. There would be animals in the forest and pets in houses. We would never have a drought. There would be oceans and mountains for people to enjoy. And there will be rivers for everyone to go fishing. Housing for everyone and healthcare for everyone. Also, have clean water." – Angel

Adelante Mujeres Stories

Focus group participants from Adelante Mujeres did not participate in the "Ideal World" activity. However, the second focus group participants were asked to draw or write a story that related to one of the sustainability goals they selected. The evaluators also asked them to write a story that they wanted visitors at OMSI to learn from. Some of the participants drew pictures and others wrote personal narratives. The following two stories were continuations of what the participants shared at the beginning of the focus group.

Sofía expanded on her reasoning for selecting *Peace, Justice, and a Violence-Free Society* as the community goal that resonated with her the most:

"There has been a lot of shootings. Especially in public spaces like schools. More and more students are feeling unsafe in a space where they shouldn't. Last year the day after one school shooting I remember my humanities teacher talking about what we should do in case if there was one here. [He said,] 'Remember if you're running, run in a zigzag pattern so it's harder for them to make you a target.'"

Yetzali titled her story "All of us are equal," which portrays a common narrative among immigrant families who are striving to have better lives. She shared:

"My mom and dad went through a lot growing up. They would wake up to a hope that they will have somewhere safe to live or have clean water to drink. My mom's mom and dad had to risk lots of things even sometimes their own life."

Yetzali's family's lived experience and history informs the knowledge and guidance they pass down:

"Be glad for what you have because some people don't have the money to get what they have."

This guidance from her dad is reflected in the appreciation Yetzali's for her parents:

"Mama y papa [sic], cuando me vean volar recuerdan que ustedes me dieron las alas."

In English this means

"Mom and dad, when you see me fly remember that you were the ones who gave me wings."

Yetzali finishes her story with a demand:

"I want all of us to have that in mind because our [parents] took so many risks to put us in the place we are. We need to make this world a better place. It's not good to run from problems, you have to face them at one point to make those problems better."

Participants spent the majority of the focus group time discussing the sustainability goals. Although the original intention was to have the participants create a linear story that reflected their chosen sustainability goal, the participants instead shared stories that were personally relevant to them. Often they shared moments when sustainability and justice were missing to highlight the importance of sustainability.

Conclusion

This evaluation study found that science museum audiences would be excited to engage in a museum exhibit about sustainability, engineering and design, and elements of the natural world that merge with cities. Both adults and children are concerned about the future of the earth, especially as it relates to climate change, waste, and pollution. Although conversations around sustainability often prompted participants to prioritize environmental-leaning issues, participants are clearly concerned with issues related to their communities. In fact, participants would often state that it was too difficult to prioritize one sustainability goal over the other because they felt they were all interconnected. For example, participants often expressed that violence and immigration could be reduced if everyone had access to affordable housing, healthcare, clean water, and food. Participants in Oregon and California often described how rising housing and healthcare costs were negatively impacting their well-being, increasing homelessness, and contributing to gentrification of communities of color. Social issues like these inevitably lead to barriers to accessing quality education, and STEM, in particular. Nonetheless, examples and representations of innovative and sustainable engineering and designs from global communities of color should be recognized in the exhibit.

Participants related to the natural world by discussing issues affecting certain geographical areas, leisurely exploring the natural world, and connections to countries of origin through family. Focus group and interview participants often recognized how waste and pollution have negatively impacted cities like Cairo, Egypt, Mexico City, and cities near the U.S./Mexico Border. Interview participants often described hiking and exploring nature as a method of escapism from everyday life. Destinations like the beach, rivers, lakes, waterfalls and national parks are cherished. Focus group participants described their connections to familial or ancestral lands, like Mexico, Italy, and the Philippines. Girls often noted if their family had tended to the land, owned land, or if they are able to visit the land where their family migrated from. The exhibit could accurately represent cities where waste and pollution is an issue, elements of exploration with water, and invoke nostalgia for immigrants and children of immigrants with a global perspective.

Potential exhibit visitors want to learn about innovative, creative solutions to climate change, waste, and pollution in a hands-on environment with imaginative representations of a "future world." However, this "future world" would be remiss in excluding elements of ancestral knowledge from humans, plants and animals that guide youth and their families through solutions to sustainability issues. Participants were particularly interested in learning about the *Reduce, Re-use, Recycle* movement, creating community gardens, sustainable building and neighborhood design, and protecting animal habitats from deforestation and pollution. Ultimately, potential visitors would like the exhibit to acknowledge past harms and provide a place to envision and engineer a sustainable world for generations to come.

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Appendices

Appendix A: Spanish Transformation of Sustainability Goals

Note: the sustainability goals were not translated into Spanish for Discovery Sprint 4

UN Sustainable Development Goals (Spanish)	Focus Group 1	Focus Group 2	Discovery Sprint 5, Focus Groups 4 and 5, Fleet Interviews
Fin de la pobreza	Hay abundancia de comida, agua, ropa, y vivienda para todos	Hay abundancia de comida, agua, ropa, y vivienda para todos	Vivienda económica
Hambre Cero	La agricultura, los bosques, y las pesquerías proveen comida nutritiva para todos	La agricultura, los bosques, y las pesquerías proveen comida nutritiva para todos	Comida económica y saludable
Salud y bienestar	Todos tienen atención médica (healthcare)	Todos tienen atención médica (healthcare)	Todos tienen acceso a atención médica
Educación de calidad	Todos tienen acceso a educación de calidad	Todos tienen educación de calidad	Educación de calidad
Igualdad de género	Todas las niñas y mujeres tienen acceso y son representadas en la toma de decisiones políticas y económicas	Todas las niñas y mujeres forman parte de la toma de decisiones políticas y económicas	
Agua limpia y saneamiento	Los ecosistemas de agua dulce y las instalaciones de saneamiento son accesibles en todos los países	Los ecosistemas de agua dulce y las instalaciones de saneamiento son accesibles en todos los países	Acceso a agua limpia
Energía asequible y no contaminante	La energía limpia, la energía eficiente, y la energía renovable son accesibles en todos los países	Todos los países usan energía limpia	
Trabajo decente y crecimiento económico	Salarios base y condiciones seguras de trabajo que contribuyen al crecimiento económico	Salarios base y condiciones seguras de trabajo que contribuyen al crecimiento económico	Salarios base y condiciones seguras de trabajo
Industria, innovación e infraestructura	Las ciudades prosperan en armonía con el mundo natural	Las ciudades prosperan en armonía con el mundo natural	
Reducción de las desigualdades	Los ingresos son distribuidos equitativamente en todos los países	Todos reciben salarios justos por su trabajo	
Ciudades y comunidades sostenibles	Los edificios, las calles y los medios de transporte son confiables y resistentes	Los edificios, las calles y los medios de transporte son confiables y resistentes	
Producción y consumo responsables	Las compañías reducen sus desechos y contaminación	Las compañías reducen sus desechos y contaminación	Manejo de residuos y contaminación
Acción por el clima	El planeta tiene ecosistemas balanceados	El planeta tiene ecosistemas balanceados	Acción climática
Vida submarina	Los animales y la vegetación prosperan bajo el agua	Los animales y la vegetación prosperan bajo el agua	Las plantas y los animales prosperan
Vida de ecosistemas terrestres	Los animales y la vegetación prosperan en la tierra	Los animales y la vegetación prosperan en la tierra	Las plantas y los animales prosperan
Paz, justicia e instituciones sólidas	Una sociedad con paz, justicia y libre de violencia	Una sociedad con paz, justicia y libre de violencia	Antiviolencia
Alianzas para lograr los objetivos	Solidaridad existe entre todas las personas y los países	Existe armonía entre todos los países y las personas	Derechos de inmigración

Appendix B: Discovery Sprint 1 Interview Instrument (English)

DOT: Discovery Sprint Interview I, Relationship to natural world

Group #_____ Date _____ Staff _____

We are developing an exhibit where engineering imitates nature to solve human challenges. We would like to get some help from you by asking you a few questions about your relationship to the natural world.

1. What is a strong memory you have of the natural world? (or *Can you describe a positive or happy memory you have of the natural world?)*

(Ask other relevant questions: how old were you? Who were you with?)

a. What words do you associate with the natural world?
  What emotions do you associate with the natural world?
  What environments do you associate with the natural world?

2. How do you see the natural world as part of your culture? (Or *Are there any activities in your daily life that take place in nature?* Or *What has your family shared with you about the natural world?)*

3. How would you imagine humans coexisting with the rest of the natural world in the future?

4. What inspires hopefulness, for you, in the future of the natural world?

Appendix C: Discovery Sprint 1 Interview Instrument (Spanish)

DOT: Discovery Sprint Interview I, relación con el mundo natural

Group #_____   Fecha _____   Recolector/a de datos _____

Estamos creando una exhibición en la cual ingeniería imita la naturaleza para resolver desafíos humanos. Nos gustaría entrevistarlo/a/os/as sobre su relación con la naturaleza. No tienen que contestar todas las preguntas y pueden parar cuando quieran.

1. ¿Tiene una memoria fuerte sobre la naturaleza? (O: ¿Puede describir una memoria positiva o feliz acerca de la naturaleza?)

(Haga otras preguntas relevantes como: ¿Cuantos años tenía?, ¿Con quién estaba?, ¿A dónde fueron?)

a. ¿Cuáles palabras usa para describir la naturaleza?
> *¿Cuáles emociones siente cuando piensa en la naturaleza?*
> *¿Cuáles ambientes asocia con la naturaleza?*

2. ¿Cómo ve la naturaleza de parte de su cultura? (O ¿hay actividades en su vida diaria que hace en la naturaleza? O ¿Qué le ha contado su familia sobre la naturaleza?)

3. ¿Cómo imagina que los humanos puedan coexistir con el resto de la naturaleza en el futuro?

4. ¿Qué inspira esperanza para usted en el futuro del mundo natural?

Appendix D: Discovery Sprint 2 Interview Instrument (English)

DOT: Discovery Sprint Interview II
Group #_____ Date _____ Staff _____

1. **What are your first memories of the natural world?**

2. **Think of some scenes in movies that come to mind of the natural world. What is particularly appealing to you about them?**

3. **Choose any part of the natural world to live in. How would you imagine yourself relying on nature to live and thrive?**

4. **Oftentimes people see technology and nature in opposition to each other. How would you imagine creating technology and infrastructure that fits in with nature?**

5. **What can we learn from nature when creating things? (buildings, bridges, water supply, transportation, roads)**

    a. What do you imagine would be in an exhibit about designing with nature in mind?
    b. What would you like to see in that exhibit?

6. Including yourself, how many people in your group are in each of the following age groups?

Age	#
0-8	
9-11	
12-14	
14-18	
18-25	
25-30	
30-40	
40-50	
50-60	
60-70	
70+	
Other: _____	

7. Including yourself, how many people in your group identify with the following genders?

Gender	#
Female	
Male	
Non-binary	
Prefer not to say	

8. Including yourself, how many people in your group identify with the following racial/ethnic categories?

Race/ethnicity	#
American Indian or Alaska Native	
Asian	
Native Hawaiian or other Pacific Islander	
Black or African-American	
White	
Hispanic or Latino/a/x	
Middle Eastern	
Multi-racial	
Other:_____	
Not sure	
Prefer not to say	

Appendix E: Discovery Sprint 2 Interview Instrument (Spanish)

DOT: Discovery Sprint Interview II
Grupo #_____ Fecha _____ Recolector/a de datos _____

1. **¿Cuáles son tus primeras memorias del mundo natural?**

2. **Piensa en algunas escenas de películas en las que sale el mundo natural. ¿Qué es particularmente interesante de las escenas?**

3. **Escoge cualquier parte del mundo natural en dónde vivir. ¿Cómo te imaginas que te apoyarías en la naturaleza para vivir y prosperar?**

4. **Muchas veces la gente ve a la tecnología en oposición a la naturaleza. ¿Cómo imaginas crear tecnología e infraestructura que fluye con la naturaleza?**

5. **¿Qué podemos aprender de la naturaleza cuando estamos creando cosas? (edificios, puentes, sistems de agua, transporte, y calles)**

    a. ¿Qué imaginas que habría en una exhibición sobre diseñar basándose en la naturaleza?

    b. ¿Qué te gustaría ver en esta exhibición?

6. Incluyéndose a si mismo/a, ¿cuántas personas en su grupo están en los siguientes grupos de edad?

Edad	#
0-8	
9-11	
12-14	
14-18	
18-25	
25-30	
30-40	
40-50	
50-60	
60-70	
70+	
Other: _____	

7. Incluyéndose a si mismo/a, ¿cuántas personas en su grupo se identifican con los siguientes géneros?

Género	#
Femenino	
Masculino	
No binario	
Prefiero/e no decir	

8. Incluyéndose a si mismo/a, ¿cuántas personas en su grupo se identifican con las siguientes razas o etnias?

Raza/etnia	#
Amerindio/a o nativo/a de Alaska	
Asiático/a	
Nativo/a de Hawaii u otra isla pacífica	
Negro/a o afroamericano/a	
Blanco/a	
Hispano/a o latino/a/x	
Del Medio Oriente	
Multi-racial	
Otro:_____	
No estoy sefuro/a	

Appendix F: Discovery Sprint 3 Interview Instrument (English)

DOT: Discovery Sprint Interview III
Group #_____ Date _____ Staff _____

1. **What are you first memories using technology?**

   a. What kind of technology, if it all, do you use on a daily basis?

   b. If at all, how does it make your life easier?

2. **Imagine you are in a fantasy world and you can create any technology inspired by the natural world. (Prompt: You also have an unlimited budget and resources). What would you create?**

   a. How would it make your life and other's lives easier?

3. **If you were a superhero and had to be named after something in nature, what would your name and super power be?**

   a. What would be the first global problem you would solve?

4. **What do you imagine would be in an exhibit about designing with nature as inspiration?**

   a. What global problems would you like to see solved in this exhibit?

   b. How would they (solutions) make people's lives easier?

   c. What would inspire you to become involved in those solution(s)?

Questions 5, 6, and 7 are identical to questions 6, 7, and 8 in appendix D.

Appendix G: Discovery Sprint 4 Interview Instrument (English)

DOT: Discovery Sprint Interview IV
Group #_____ Date _____ Staff _____

1. **What are some feelings you hold around the environment and the future? Or What are some feelings you hold around the environment and the future of young people?**

2. **Can you tell me about 1 or 2 issues that are affecting humans and the rest of the natural world in your community?**

   a. **What is it that makes those issues important or personally meaningful to you?**

3. **What are 1 or 2 issues you see in your community?**

   a. **What makes those issues important to you?**

4. **Number these from most relevant to least relevant to your life. (1- most important to 10- least important)**

Community Issues	Importance	Importance	Importance	Importance
Affordable housing				
Affordable and healthy food				
Access to clean water				
Climate change				
Quality education				
Waste & pollution management				
Healthcare for all				
Immigration				
Anti-violence				
Fair pay and safe work				

a. Can you tell me why you chose _____ as most relevant?

b. Can you tell me why you chose _____ as least relevant?

c. If it all, what would you add to the list?

So we've been talking about the future of the natural world and community issues that are relevant to you. We're going to move on to talk about technology and infrastructure. Oftentimes people see technology as destructive to the natural world and taking over society. Because of this we are developing an exhibit that designs technology and infrastructure that solves societal problems and fits in with nature.

5. What would you like to see in an exhibit about this? (i.e. What kind of societal problems would you like to see solved? What kind of infrastructure technology would you like to see designed? What elements of the natural world do you want to see?)

6. Including yourself, how many people in your group are in each of the following age groups?

Age	#
0-6	
7-12	
13-18	
19-35	
36-55	
56+	

7. Including yourself, how many people in your group identify with the following genders?

Gender	#
Female	
Male	

Non-binary	
Prefer not to say	

8. **Including yourself, how many people in your group identify with the following racial/ethnic categories?**

Race/ethnicity	#
American Indian or Alaska Native	
Asian	
Native Hawaiian or other Pacific Islander	
Black or African-American	
White	
Hispanic or Latino/a/x	
Middle Eastern	
Multi-racial	
Other:_____	
Not sure	
Prefer not to say	

Appendix H: Discovery Sprint 5 & Fleet Science Center Interview Instrument (English)

DOT Interview: Fleet Science Center
Data collector: _____ **Date:** _____ **Interview #**___ **Recorder #**___ **Track#** _____

The Fleet Science Center and OMSI are developing an exhibit that incorporates elements from the natural world to engineer solutions to build healthier communities. We want to hear about your experiences with the natural world and the environmental and community issues that matter to you. At the end of the interview we will have an opportunity to imagine a world where humans, animals, plant life, the natural world as a whole, and technology and infrastructure coexist.

1. **What is one thing you like to do in nature?**

2. **What are some feelings you hold around the environment and the future?**

    a. **What are some feelings you hold around the environment and the future of young people?**

3. **What are 1 or 2 issues you see in your community that are important to you?**

4. **Number these from most important to least important to your life. (1- most important to 11- least important)**

Participant 1	Participant 2	Participant 3	Participant 4

    a. Can you tell me more about how you decided to order these cards?

So we've been talking about the future of the natural world and community issues that are important to you. Now we're going to move on to talk about the things people design or make that we use in our everyday lives. The Fleet and OMSI are developing an exhibit that involves designing things that solve societal problems and fit in with nature.

5. ***Sometimes we see the things humans make in opposition to nature. Think of the place where you live.*** **How would you imagine what it would look like if the things human made fit in with nature? (materials, appliances, gadgets, toys, buildings, bridges, roads, water systems) (Give visitors 30 seconds to imagine before answering the question)**

    a. What steps would you take to make this a reality?

    b. If you were going to a place where you could learn about this topic, what would you want to see/do/feel that would draw you in?

Questions 6, 7, and 8 are identical to questions 6, 7, and 8 in appendix G.

Appendix I: Discovery Sprint 5 & Fleet Science Center Interview Instrument (Spanish)

Entrevista de DOT: Fleet Science Center
Recolector/a de datos:＿＿＿＿＿ Fecha:＿＿＿＿＿＿＿ Entrevista #＿＿Grabadora #＿＿Pista#＿＿＿＿

El Centro de Ciencias y el Museo de Ciencia e Industria de Oregon están desarrollando una exhibición que incluye elementos del mundo natural para crear soluciones que forman comunidades saludables. Nosotros queremos hablar sobre sus experiencias con el mundo natural y cuestiones ambientales y comunitarias que les importan a ustedes. Al fin de la entrevista tendrán la oportunidad de imaginar un mundo en donde coexisten los humanos, los animales, las plantas, el resto del mundo natural, y las cosas que los seres humanos crean.

1. **¿Qué es algo que te gusta hacer en la naturaleza?**

2. **¿Cuáles son algunos de los sentimientos que tienes sobre el medio ambiente y el futuro?**

    a. **¿Cuáles son algunos de los sentimientos que tienes sobre el medio ambiente y el futuro de los jóvenes?**

3. **¿Puedes mencionar 1 o 2 problemas que ves en tu comunidad que son importantes para ti?**

4. **Ordena del más importante al menos importante para tu vida (1-más importante a 11-menos importante)**

Participante 1	Participante 2	Participante 3	Participante 4

    a. **¿Me puedes contar por qué decidiste ordenar las tarjetas así?**

Hemos hablado sobre el futuro del mundo natural y cuestiones de la comunidad que te importan. Ahora vamos a cambiar de tema y hablar sobre las cosas que los humanos hacen y que usamos todos los días.

5. ***A veces vemos las cosas que hacen los seres humanos como dañinas para la naturaleza. Piensa en el lugar en donde vives. ¿Cómo imaginarías que sería si las cosas que los humanos diseñan y hacen encajasen con la naturaleza? (materiales, aparatos, ropa, o edificios)***

    a. ¿Qué pasos tomarías para hacer de esto una realidad?

    b. Si fueras a un lugar donde podrías aprender sobre este tema, ¿qué te gustaría ver, hacer, y sentir que te parecería atractivo?

6. Incluyéndote a ti mismo/a, ¿cuántas personas en tu grupo están en estas categorías de edad?

Edad	#
0-6	
7-12	
13-18	
19-35	
36-55	
56+	

7. Incluyéndote a ti mismo/a, ¿cuántas personas en tu grupo se identifican con estos géneros?

Género	#
Femenino	
Masculino	
No binario	
Prefiero/e no decir	

8. Incluyéndote a ti mismo/a, ¿cuántas personas en tu grupo se identifican con estas categorías de raza/etnicidad?

9.

Raza/etnia	#
Amerindio/a o nativo/a de Alaska	
Asiático/a	
Nativo/a de Hawaii u otra isla pacífica	
Negro/a o afroamericano/a	
Blanco/a	
Hispano/a o latino/a/x	
Del Medio Oriente	
Multi-racial	
Otro:_____	
No estoy seguro/a	
Prefiero/e no decir	

Appendix J: Focus Group Instrument 1 (Adelante Mujeres)

DOT focus group questions: Girls ages 9-14

Welcome/Details of focus group (10 min, :10)
OMSI is in the beginning stages of creating an exhibit about *sustainability and engineering*. We want to learn more about what would spark your interest in these topics. We're going to pass out guidelines/a worksheet that will help you create your own sustainability story. You'll be able to choose a sustainability issue that resonates with you, identify the role you want to play, and where you want to make the impact/change happen in the world, but first we will start with an ice breaker…

Icebreaker: Who is an Engineer? (15 min, :25)
Girls will share their names and ages, then participate in an ice-breaker that involves challenging stereotypes about who can be an engineer.
*[Instructions for data collector: Hand out the laminated cards of engineers. Give each group 5-6 cards. Discuss the questions on the board and sort the cards into two different piles: Engineer and not engineer. When each group has finished sorting every card, let them turn the cards over and read the backs. Think of two questions as you sort the cards: **write on the board:** What does an engineer do? And what does an engineer need to have?]*

All of the people picture are engineers! Engineers use science, math, and creativity to solve problems for people and improve our world. They often work in teams and test out many different ideas before finding one that works best. They come from all backgrounds and can be any gender or age.

Bring the whole group back together and ask girls what their reactions were and what they learned.
*1.	Were you surprised by the results of this activity?*
*2.	How did you decide if a person was an engineer or not?*

Focus group overview and ground rules (4 min, :29)
[*Instructions for focus group facilitator: This activity is meant to identify sustainability goals that resonate with you and your community to help us build an exhibit with your experiences and stories in mind. We want to hear where you would envision this type of change being made, which ecosystem and which city or country that you are personally connected to. We also want to hear about the role you would like to play in making the world a safer and healthier place for yourself and your community. Lastly, we want to hear how you think engineers might play a role in making the natural world and our communities a safer and healthier place for humans, animals, and plant life.*]

Story-telling Activity (56 min, :85)
In this new exhibit, you will wander into an exciting environment and become part of a story where you are invited to make the world a better place for all. Please help us create a story for the exhibit by telling us your preferences for the following:

[Instructions for data collector: Provide each girl with a print out of the story-telling activity so that they are able to draw, write, and circle their choices. As much as they would like to share with each other while they are making their decisions, remind them that there will be time at the end to share their ideas with each other. Walk the girls through the story-telling prompt and then, allow them to tell the story on the paper after answering any clarifying questions.]

Envision a world where. . . (6 min, :35)
    1. Pick a goal from each category that you think is important. (Circle one from each category).

[Note: Each of these vision statements will be placed on a card with graphics as a visual tool for the visitors]

Community	Environment	Economic
Everyone has quality education	Fresh water and sanitation facilities are available in all countries	There is an abundance of food, water, clothing, and shelter for everyone
All girls and women are part of political and economic decision making	All countries use clean energy	Living wages and safe working conditions that contribute to economic growth
Agriculture, forestry, and fisheries provide nutritious food for all	Cities prosper in harmony with the natural world	Buildings, roads, and transportation are reliable and resilient
Peace, justice, and violence-free society	The planet has balanced ecosystems	Everyone is paid a fair amount for their work
Everyone has healthcare	Animals and plant life are thriving underwater	Companies reduce waste and pollution they produce
Harmony exists among all people and countries	Animals and plant life are thriving on the land	

(15 min, :50)
    2. Looking back over the pieces you've selected for this story, can you tell me more about your **favorite** goal?
        a. What would you like to learn more about them?

The places in the story (3 min, :53)

3. If you had to choose where to achieve the goals you selected, where would you want to be in this story? We want to hear about an ecosystem and city or country that matters to you.

[Note: Each of these outdoor places will be placed on a card with graphics as a visual tool for the visitors]

Outdoors (circle one)	country/city (fill in the blank)
forest	
desert	
ocean	
river	
tundra	
prairie/meadow	
other:	

(7 min, :60)

4. What made you want to set your story in the part of the natural world that you selected?

The role in the story (2 min, 62)

5. If you had to figure out how to achieve the goals you selected, which of these roles would you want to play?

(pick your occupation)

Architect	Photographer
Builder	Artist
Designer	Farmer
Director	Educator
Inventor	Doctor
Planner	Electrician
Engineer	Politician
Social activist	Other:

(10 min, :70)

[Example prompt for data collector: I see that you picked "[eg. Designer]."

6. What made you want to play this role in the story you created?
7. What kind of problems do people in this role solve?
   a. What do they care about?

Engineering (13 min, :85)

*[Instructions for data collector: After discussing the roles they chose, share this definition of engineering and sustainable engineering with them: **Engineers** are people who solve community problems by designing and creating things that make our lives easier and better. **Sustainable engineers** are people who design things in a way that does not harm the natural environment or the ability of future generations to meet their own needs]*

8. Engineering is connected to each role in some way. With these definitions in mind, how might you imagine the role you chose to be related to engineering?
9. **Or** if you did choose engineering how would an engineer tackle the goal you selected?
10. How do you think an engineer that practices sustainability solves problems?
    a. What do they care about?

Closing (5 min, :90)

[Prompt for data collector: Thank you so much for participating in the story-telling activity and sharing your ideas for creating a better world together. The exhibit will be greatly impacted by your stories and ideas. If you have any other thoughts or questions, please let me know. Hand out OMSI or Fleet passes]

Appendix K: Activity Sheets for Focus Groups in Oregon

ECONOMIC

There is an abundance of food, water, clothing, and shelter for everyone

Living wages & safe work conditions contribute to economic growth

Buildings, roads, and transportation are reliable and resilient

Everyone is paid a fair amount for their work

Companies reduce waste and pollution

ENVIRONMENT

Fresh water ecosystems and sanitation facilities are accessible in all countries

All countries use clean energy

Cities prosper in harmony with the natural world

The planet has balanced ecosystems

Animals and plant life thrive underwater

Animals and plant life thrive on the land

COMMUNITY

Everyone has quality education

All girls and women are part of political and economic decision making

Agriculture, forestry, and fisheries provide nutritious food for all

Everyone has healthcare

Peace, justice, and violence-free society

Harmony exists among all people and countries

PLACES

FOREST

DESERT

OCEANS

TUNDRA

PRAIRIE

RIVERS

OTHER
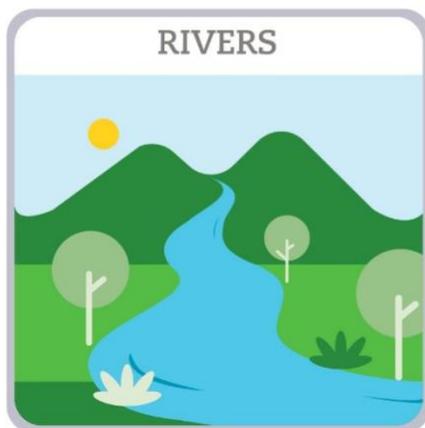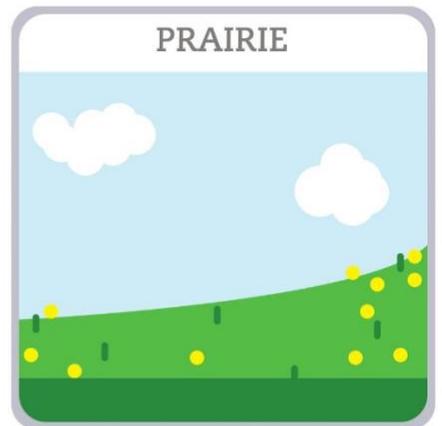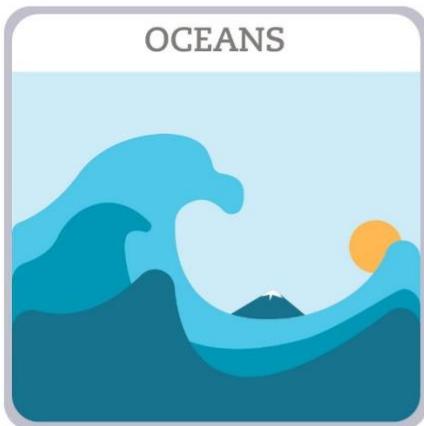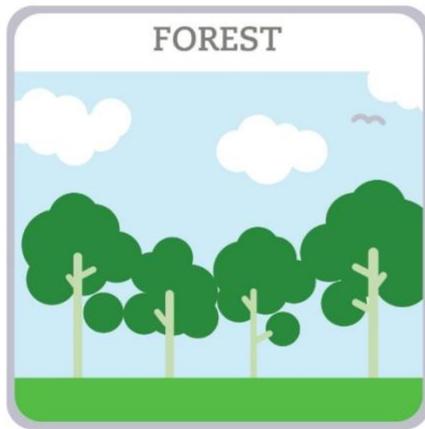
Appendix L: Activity Sheets for Focus Groups in Oregon (Spanish)

ECONOMÍA

Hay abundancia de comida, agua, ropa, y vivienda para todos

Salarios base y condiciones seguras de trabajo que contribuyen al crecimiento económico

Los edificios, las calles y los medios de transporte son confiables y resistentes

Todos reciben salarios justos por su trabajo

Las compañías reducen sus desechos y su contaminación

MEDIO AMBIENTE

Los ecosistemas de agua dulce y las instalaciones de saneamiento son accesibles en todos los países

Todos los países usan energía limpia

Las ciudades prosperan en armonía con el mundo natural

El planeta tiene ecosistemas balanceados

Los animales y la vegetación prosperan bajo el agua

Los animales y la vegetación prosperan en la tierra

COMUNIDAD

Todos tienen educación de calidad

Todas las niñas y mujeres forman parte de la toma de decisiones políticas y económicas

La agricultura, los bosques, y las pesquerías proveen comida nutritiva para todos

Todos tienen atención médica (healthcare)

Una sociedad con paz, justicia y libre de violencia

Existe harmonía entre todas las personas y los países

LUGARES
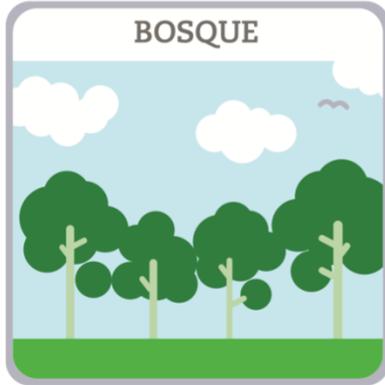
BOSQUE	DESIERTO
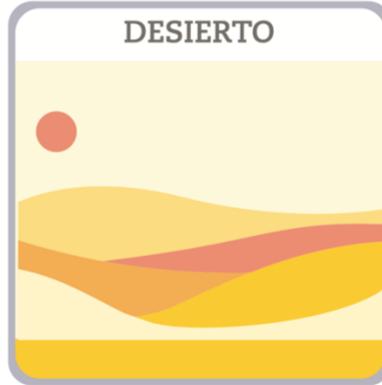
OCÉANOS	TUNDRA	PRADERA
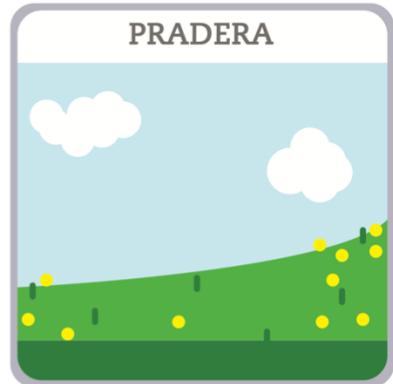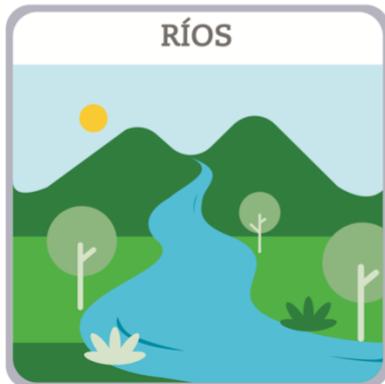
RÍOS	OTRO

Appendix M: Focus Group Instrument 2 (Adelante Mujeres)

DOT focus group questions: Girls ages 9-14

Intros/name tags **(10 minutes, :10)**
OMSI: name, position, intro to DOT project/why we are here, favorite thing to do in nature
Girls: Pseudo name, favorite thing to do in nature

Bring the whole group back together and ask girls what their reactions were and what they learned. **(15 minutes, :25 minutes)**
1.   Were you surprised by the results of this activity?
2.   How did you decide if a person was an engineer or not?

Story-telling Activity (56 min, :85)
This activity is meant to identify sustainability goals that resonate with you and your community to help us build an exhibit with your experiences and stories in mind. We want to hear where you would envision this type of change being made, which ecosystem and which city or country that you are personally connected to. We also want to hear about the role you would like to play in making the world a safer and healthier place for yourself and your community. Lastly, we want to hear how you think engineers might play a role in making the natural world and our communities a safer and healthier place for humans, animals, and plant life.]

Before starting the actual activity: (2 minutes, :27)

1.   Where on the map are you located? Where have you lived? Where have your family/ancestors lived? What did their home/landscape look like?

Fill out the activity sheet (10 minutes, :37)

Sustainability (15 minutes, :52)
11. Looking back over the pieces you've selected for this story, can you tell me more about your **favorite** goal?
   b.   What would you like to **learn** more about them?

The places in the story 6 "Corners" activity (if you see energy is low in the room) (8 min, :60)
1.   What made you want to set your story in the **ecosystem** and **city, state, or country** that you selected?
   a.   Prompt: (family, community, a photo from the trifold caught your attention, related to the environment, community, or economy? etc)

(10 min, :70)
1. What made you **want to play** this role in the story you created?
2. What kind of **problems** do people in this role **solve**?
    a. What do they **care** about?

Story Time: (10 minutes, :80)

Allow time to think about a cohesive, linear story. Draw the story the way you envision or write a story with the pieces you've chosen.

Engineering (15 min, :85)
*[Instructions for data collector: After discussing the roles they chose, share this definition of engineering and sustainable engineering with them: **Engineers** are people who solve community problems by designing and creating things that make our lives easier and better. **Sustainable engineers** are people who design things in a way that do not harm the natural environment or the ability of future generations to meet their own needs]*
1. Engineering is connected to each role in some way. With these definitions in mind, how might you imagine the role you chose to be **related to engineering**?
2. **Or** if you did choose engineering how would an **engineer tackle the goal** you selected?
3. How do you think an engineer that practices sustainability solves problems?
    b. What do they care about?

Closing (5 min, :90)
[Prompt for data collector: Thank you so much for participating in the story-telling activity and sharing your ideas for creating a better world together. The exhibit will be greatly impacted by your stories and ideas. If you have any other thoughts or questions, please let me know. Hand out OMSI or Fleet passes]

Appendix N: Sustainability Activity Sheet

YOUR STORY:

Pseudo name: _____ Age: _____ Grade: _____

In this new exhibit, you will wander into an exciting environment and become part of a story where you are invited to make the world a better place for all! Help us create a story for the exhibit by telling us your choices for the following:

① Pick a goal from each category that you think is important. (Circle one from each category).

COMMUNITY

- Everyone has quality education
- Farms, forestry, and fisheries provide nutritious food for all
- There are leaders of all genders everywhere
- Everyone has healthcare
- Peace, justice, and violence-free society
- Harmony exists among all people and countries

ECONOMY

- There is food, water, clothing, and shelter for everyone
- Companies reduce waste and pollution
- Fair pay & safe work conditions contribute to a fruitful economy
- Buildings, roads, and transportation are reliable and resilient

ENVIRONMENT

- Fresh water ecosystems and sanitation facilities are accessible in all countries
- Cities prosper in harmony with the natural world
- Animals and plant life thrive underwater
- Animals and plant life thrive on the land
- The planet has balanced ecosystems
- All countries use clean energy

Notes: _____

② If you had to choose where to achieve the goals you selected, where would you want to be in this story? We want to hear about an ecosystem and city or country that matters to you.

NATURAL WORLD

- FOREST
- TUNDRA
- DESERT
- PRAIRIE
- OCEANS
- RIVERS
- OTHER
- ?

City / country / state: _____

③ If you had to figure out how to achieve the goals you selected, which of these roles would you want to play? (Circle one)

Architect	Photographer
Builder	Artist
Designer	Farmer
Director	Educator
Inventor	Doctor
Planner	Electrician
Engineer	Politician
Social activist	Other: _____

Appendix O: Focus Group Instrument 3 (Fleet Science Ctr.)

Introduction to Focus group: **(5 min; :5)**
The Fleet Science Center and OMSI are developing an exhibit that incorporates elements from the natural world to engineer solutions to build healthier communities. We want to hear about your experiences with the natural world and the environmental and community issues that matter to you. At the end of the focus group we will have an opportunity to imagine a world where humans, animals, plant life, the natural world as a whole, and technology and infrastructure coexist.

Icebreaker Options: **(10 min; :15)**
- Name
- Where is your favorite place to go in nature? What's your favorite thing to do in nature?

Ancestor & Landscape visualization **(10 min; :25)**
1. Reflect on the landscape, plants, and animals of where your ancestors, grandparents, and parents came from. What did you see?
2. Are there any elements that you saw that are important to you now and how do you integrate them into your life?

Focus Group Questions:
1. What are some feelings you hold around the environment and the future? **(5 min; :30)**
2. What are 1 or 2 issues you see in your communities that are important to you? **(7 min; :37)**
3. Number these from most important to least important to your life. (1- most important to 11- least important) **(8 min; :45)**

Community Issues	Importance
Plant and animal life thrive	
Affordable housing	
Affordable and healthy food	
Access to clean water	
Climate action	
Quality education	
Waste & pollution management	
Healthcare for all	
Immigration rights	
Anti-violence	
Fair pay and safe work	

Can you tell me more about how you decided to order the community issues?

BREAK: (5 min; :50)
Imagine and Design your Ideal World **(5 min; :55)**
This activity is meant to create and imagine a world that creates a path to a better future, where humans, animals, technology, and infrastructure coexist.
What does it take to create a Utopian World? (Hand-out)
- Your ideal world should be a path to a better future, where humans, animals, technology, infrastructure, and the rest of the world co-exist.
- Compassion for ourselves, our communities, and the rest of the natural world
- Inspiration to solve a problem
- Creativity to imagine solutions
- Passion to pursue change

Prompt (Hand-out) **(15 min; :70)**
1. Who will be the story-teller of this Utopian society? Who can you empathize with?
   o Animal
   o Human (age, background)
   o Non-living being
   o Other
2. When does your ideal world take place? (Past, Present, Future)
3. Describe a city that fits in with the natural world you created. Where and when does your ideal world take place? What elements from nature would you include? (animals, plants, water, fire, earth, air, mountains, forests, oceans, rivers, and more)
4. Create 1 community agreement to ensure harmony and safety for all people, animals, and plant life based on the problems you want to solve.

Share out: **(15 min; :85)**
Thank you and pass out Fleet passes: **(5 min; :90)**

Appendix P: Ideal World Activity

MY IDEAL WORLD

Imagine a world that creates a path to a better future, where humans, animals, plant life, technology, and infrastructure coexist.

NAME   AGE   DATE

WHO WILL BE THE STORY-TELLER? ANIMAL, HUMAN |AGE, BACKGROUND, ETC|, NON-LIVING BEING, OTHER

WHEN DOES YOUR IDEAL WORLD TAKE PLACE? |PAST, PRESENT, FUTURE|

DESCRIBE A CITY THAT FITS IN WITH THE NATURAL WORLD. WHAT ELEMENTS FROM NATURE WOULD YOU INCLUDE? |ANIMALS, PLANTS, WATER, FIRE, EARTH, AIR, MOUNTAINS, FORESTS, OCEANS, RIVERS, AND MORE|

CREATE 1 COMMUNITY AGREEMENT TO ENSURE HARMONY AND SAFETY FOR ALL PEOPLE, ANIMALS, AND PLANT LIFE