OCEAN DISCOVERY INSTITUTE
EVALUATION REPORT
September 2023 – August 2024

About Ocean Discovery Institute

To inspire the next generation of science leaders, Ocean Discovery Institute creates learning experiences for young people traditionally excluded from science due to race, income status, and educational opportunity. Our students will join high-paying fields, break generational poverty, and change the future of science.

Our Evaluation Approach

Evaluation is a significant component of our educational model. Evaluation of our programs and our students provides critical data that guides us in determining progress towards our goals, informs subsequent enhancements to our programs, and keeps our efforts aligned with our mission.

Our Educational Programs and Goals

Our educational programs are structured with a "pyramid" approach (Fig. 1). Our pyramid design demonstrates the number of students reached by a program, with an inverse relationship between the number of students reached and the intensity and impacts generated through participation.

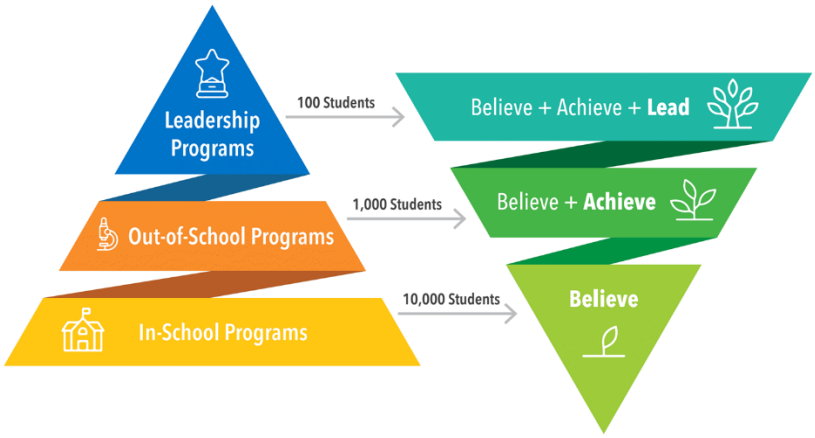


Figure 1. The pyramid approach to our educational programs, showing the number of students served by each program when our programs have reached full capacity, student goals by program, and the scale of impacts generated through participation.

We provide our programs through three distinct, and progressively rigorous, educational programs (Fig. 1):

- In-School Programs serve entire classes of K-12 students during the school day with hands-on science activities and field trips.
- Out-of-School Programs serve K-8 students who sign up to come to the Living Lab after school and in summer to participate in science camps.
- Ocean Leader Programs serve students beginning the summer before 9th grade through a rigorous pathway program to prepare students to go to college and become science leaders.

This educational model drives our evaluation goals, which are as follows for each program:

- Our In-School Programs will break down barriers of perception toward science, build community ownership of a place of science, and nurture our students to BELIEVE that science is something they can do and a scientist is someone they can be.
- Our Out-of-School Programs will build upon our In-School Programs by additionally supporting our students to ACHIEVE improved understanding of scientific concepts and the scientific process, as well as achievement of positive academic performance in school.
- Our Ocean Leader Programs will build upon the science belief and achievement fostered in our In- and Out-of-School Programs and empowers our students to LEAD by taking the necessary steps to pursue and obtain careers in science or science-related fields, by taking opportunities to use science to make a difference, and by participating as science leaders and mentors.

OUR EVALUATION METHODS

We combine both qualitative and quantitative evaluation methods for all programs:

- *Qualitative:*
  - Observations of program alignment with our Education Foundation (the guiding document of our educational philosophies and design principles)
  - Observations of instructor alignment with our Educator Principles (the guiding document for instructors' pedagogical approach across all programs)
  - Collection of stakeholder feedback (Teacher and Family)
- *Quantitative:*
  - We use a variety of assessment methods to assess student outcomes, including research-informed surveys, quantitative assessments, comparisons of academic data, and college matriculation and graduation data. We implement these methods during programs, then analyze the data and communicate outcomes via a variety of internal and external channels.

HIGHLIGHTED EVALUATION RESULTS: 2023-24 ACADEMIC YEAR (SEPTEMBER 2023 THROUGH AUGUST 2024)

Quantitative: Numbers Served

Introduction & Methods

- Our "pyramid" program model is described above and shown in Fig. 1.
- Student attendance is recorded at each program session and entered into our program database.

Results

In-School Programs

IS Grade	Original Projection	Actual Attendance	Cluster Enrollment	% of Grade Served
Kinder	577	606	887	68%
1st	615	607	685	89%
2nd	658	669	653	102%
3rd	617	620	672	92%
4th	625	650	689	94%
5th	621	654	702	93%
6th	507	458	500	92%
7th	455	437	519	84%
8th	468	472	499	95%
9th	612	366	604	61%
10th	272	329	617	53%
11th	0	131	476	28%
12th	0	36	433	8%
Total	**6027**	**6035**	**7936**	**76%**

Table 1. Number of students served by In-School Programs, including the original projection of numbers served, the actual student attendance, the number of students enrolled in that grade level in our Cluster, and the percentage of that grade level served.

Out-of-School Programs

Participation by Program	# Served
After-School Camp Only	448
Summer Camp Only	109
Participated in Both Programs	244

OS Program	# Served
After-School Camp	692
Math Pilot	63
Summer Camp	353
Total – Includes Duplicates	**1108**
Total – No Duplicates	**557**

Table 2. Top: Number of students served in the two primary Out-of-School Programs (After-School Camp and Summer Camp). Bottom: Total number of students served.

Ocean Leader Programs

OL Program	# Served
Ocean Leader Wednesdays	67
Bridge	19
Intro to Research	21
Research at USD	21
Total High School Students	**67**
Total Alumni	**195**
Total High School + Alumni	**262**

Table 3. Number of students served in Ocean Leader Programs.

All Programs Numbers Served

Program	# Served: 2022-23	# Served: 2023-24
In-School	5,622	6,035
Out-of-School	891	1,108
Ocean Leader	204	262
Total – Includes Duplicates	6,717	7,405
Total – No Duplicates	5,826	6,230

Table 4. Number of students served in all programs. The number including duplicates shows students who participated in both In-School and Out-of-School programs. The number not including duplicates shows the number of unique students served.

Hours of Programming

Program	# Served	Average Hours Per Student			Total Program Hours	Total Student Hours
In-School	6,035	7			1,635	49,050
Out-of-School	1,108	*After-School*	*Summer*	*Total*	690	22,071
		12	39	21		
Ocean Leader	262	*High School*	*Alumni*	*Total*	815	12,906
		186	3	60		
Total	**7,358**	**16**			**3,140**	**84,027**

Table 5. Number of hours of programming provided for students, including average hours per student, the number of total hours provided by each program, and the total student hours.

Ethnicity	Percentage of Students Served
Black / African American	11%
American Indian / Alaska Native	<0.1%
Asian	12%
Pacific Islander / Native Hawaiian	<0.1%
Caucasian	4%
Hispanic / Latino	67%
Multi-racial / Other	6%

Table 6. Ethnic breakdown of students served.

Discussion

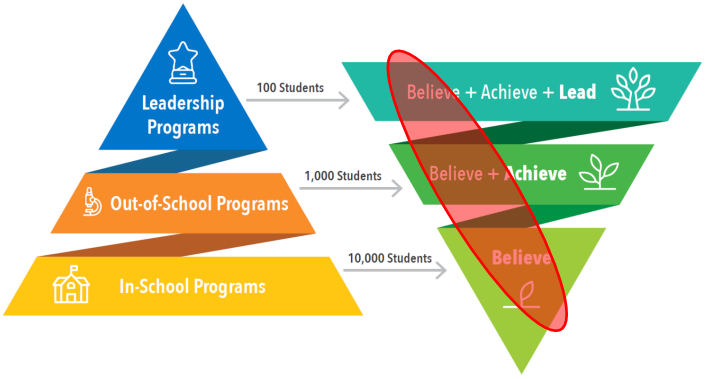
- **Communication Points:**
  - **During the 2023-24 school year, 6,230 students from a low-income community of color participated in tuition-free science programming.**
  - **As programs continued to expand, the number of student hours of participation increased by 19% from the previous year.**
- This was the first year in Ocean Discovery's history that 10th and 11th grade students were served by In-School Programs. In 2024-25, we will launch our 12th grade In-School Programs for the first time.
- The final In-School Program attendance (6,035) was close to the original projection (6,027).
- 102% of 2nd grade students in the Hoover Cluster being served can be explained by an increase in 2nd grade enrollment during the school year (and after our original projection was made).
- The percentage of middle school students (grades 6-8) participating (90%) was higher than in the previous school year (77%). This increase is likely due to strategic communication and planning with middle school teachers to address low attendance in previous years and find solutions to attendance challenges.
- Continuing a trend from the previous school year, the Kinder grade had the lowest percentage of students participating (68%) of any elementary school grade level in the In-School Program. We suspect

that this may actually be an enrollment issue, rather than attendance, as we know that Kinder enrollment in our schools fluctuates more than any grade. We know that enrollment at our schools declines from the beginning of the school year to the end, and Kinder is the last grade we serve during the school year.

- Only 61% of 9th grade students were served by the In-School Program. This is due to ongoing scheduling logistic challenges that will be addressed as the In-School high school program continues to develop. For example:
    - High school students are required to obtain permission from each of their teachers to attend field trips, adding more variables that could potentially prevent them from participating.
    - Our current scheduling model is to schedule programs with 9th grade Biology teachers. This means that 9th grade students in Hoover's Health Academy (who do not take Biology) and any other 9th grade student not enrolled in a Biology course are unable to participate.
    - We plan to continue to work with our partners at Hoover to ensure that all students have the opportunity to participate.
- Out-of-School Program attendance increased by 20% from the previous school year. This increase may be explained by two factors:
    - A strategic recruitment effort that had a full-time staff dedicated to filling program spaces for an entire year.
    - Daily, cost-free transportation in partnership with San Diego Unified School District from school sites to Ocean Discovery significantly increased program participation.

Quantitative: Student Belief

Introduction



For individuals in our community and beyond, substantial inequities exist along the pipeline from birth to science and science-related careers. Belief provides the motivation to persist in the face of these barriers. It manifests itself in positive academic behaviors and performance, and, in turn, fuels students' perseverance along their educational and career pathway. Our programs are designed to address the many opportunity gaps in the educational pathway experienced by our community and build in students, first, a belief that science is something they can do and scientist is someone they can become. Furthermore, we maintain an unshakeable belief in our students' potential, and in turn they believe in themselves.

Across all programs, the functional goal is that 70% of students demonstrate a positive sense of self-belief in science.

Methods

In-School Programs:

- Within our In-School Programs, the self-evaluation Believe Survey is implemented once per student per grade level starting in 3rd grade. Each student attending our In-School Program completes a Believe Survey once in each grade level, and specifically during the lesson that takes place at the Living Lab (typically the third and last day of a given curriculum).
- In the 2023-24 school year, we piloted the use of a modified Believe Survey for 2nd grade students. The survey had fewer questions and incorporated more visuals and less text to accommodate students with different reading abilities.

Out-of-School Programs:

- Within our Out-of-School Programs, the self-evaluation Believe Survey is implemented once per student for students in 3rd grade and older. Each student attending our After-School Camp and/or Summer Camp completes a Believe Survey once per program, and specifically on the fifth and final day of camp.
- During Summer Camp, an updated version of the Believe Survey was administered to reflect the program's new emphasis on math self-identity and self-efficacy:
    - 6 of the survey questions were modified to include math self-identity and self-efficacy. These questions were aligned to the goal "I Believe I Am A Math Person and Can Use Math to Make A Difference."
    - The remaining 6 questions were aligned with the original survey goals focused on science, with the exception of the goal "I Believe I Can Have A Career in Science".

Ocean Leader Programs:

- Within our Ocean Leader Programs, the self-evaluation Believe Survey is implemented once per student. Each student participating in an intensive summer program completes a Believe Survey once per program, and specifically on the twelfth and final day of the program.
- The Believe Survey was not administered during the pilot year of the Ocean Leader Research at USD Program.

All Programs:

- The survey is implemented by program staff according to the Believe Survey Administration Protocol.
- Each student's Likert-type responses to the twelve Believe statements are entered into the Believe survey database, along with relevant categorical information (e.g., student name, grade level, school). In the database, the Likert-type responses are coded such that 5 represents the most positive response and 1 the least positive response for a given statement.
- The analyses for our In-School Programs take two approaches: 1) assessing the extent to which each grade level has positive responses regarding each BELIEVE goal, and 2) assessing whether the impacts of our programming, which are believed to be additive, are demonstrated through having equally large or larger positive responses for eighth graders compared to their younger peers.

Results

In-School Programs

	Total	I Believe I Can Have A Career In Science		I Believe I Can Do Science		I Believe Science Is Important		I Believe Science Is Relevant		I Believe I Can Use Science To Make A Difference		I Believe That I Have A Growth Mindset	
Grade	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)
1	NA												
2	79%	2.6 of 3	70%	2.7 of 3	78%	2.9 of 3	89%	2.9 of 3	88%	2.6 of 3	70%	NA	NA
3	73%	3.8	65%	3.8	68%	3.9	71%	4.0	71%	4.3	78%	4.4	83%
4	70%	3.7	60%	3.7	61%	3.9	70%	3.9	70%	4.2	78%	4.3	82%
5	67%	3.5	58%	3.6	59%	3.8	67%	3.8	65%	4.1	68%	4.3	83%
6	NA												
7	68%	3.5	57%	4.0	63%	3.8	66%	3.8	67%	4.1	77%	4.2	79%
8	63%	3.3	49%	3.5	54%	3.7	63%	3.8	66%	4.0	69%	4.0	77%
9	68%	3.6	57%	3.6	56%	4.0	71%	3.9	69%	4.0	73%	4.4	83%
10	71%	3.9	67%	3.7	62%	4.0	73%	3.9	67%	4.1	75%	4.3	83%
11	NA												
12	NA												
1-2 Total	**79%**	**2.6 of 3**	**70%**	**2.7 of 3**	**78%**	**2.9 of 3**	**89%**	**2.9 of 3**	**88%**	**2.6 of 3**	**70%**	**NA**	**NA**
3-5 Total	**70%**	**3.7**	**61%**	**3.7**	**63%**	**3.9**	**69%**	**3.9**	**69%**	**4.2**	**75%**	**4.3**	**83%**
6-8 Total	**65%**	**3.4**	**53%**	**3.8**	**58%**	**3.8**	**64%**	**3.8**	**66%**	**4.1**	**73%**	**4.1**	**78%**
9-12 Total	**70%**	**3.8**	**62%**	**3.7**	**59%**	**4.0**	**72%**	**3.9**	**68%**	**4.1**	**74%**	**4.4**	**83%**
3-12 Total	**68%**	**3.6**	**59%**	**3.7**	**60%**	**3.9**	**69%**	**3.9**	**68%**	**4.1**	**74%**	**4.3**	**81%**
1-12 Total	**70%**	**3.6**	**60%**	**3.7**	**63%**	**3.9**	**71%**	**3.9**	**70%**	**4.1**	**73%**	**4.3**	**81%**

Table 7. Results of the Believe Survey for In-School Programs. For each grade level, the % of survey responses that were "positive" (a 4 or 5 on a scale of 1-5) is shown. The same % and average response for each of the five Believe goals is also shown.

Out-of-School Programs

	Total	I Believe I Can Have A Career In Science		I Believe I Can Do Science		I Believe Science Is Important		I Believe Science Is Relevant		I Believe I Can Use Science To Make A Difference		I Believe That I Have A Growth Mindset	
Program/Term	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)
After-School Fall	75%	4.1	71%	4.1	71%	4.2	80%	4.1	68%	4.2	79%	4.2	81%
After-School Spring	65%	3.6	53%	3.7	62%	4.0	69%	3.7	60%	4.0	69%	4.2	75%
After-School Total	**70%**	**3.9**	**62%**	**3.9**	**67%**	**4.1**	**75%**	**3.9**	**64%**	**4.1**	**74%**	**4.2**	**78%**

	Total	I Believe I Am A Math Person and Can Use Math to Make A Difference.		I Believe I Can Do Science		I Believe Science Is Important		I Believe Science Is Relevant		I Believe I Can Use Science To Make A Difference		I Believe That I Have A Growth Mindset	
Program	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)
Summer Camp	67%	3.8	66%	3.8	64%	3.7	64%	3.9	66%	4.1	74%	4.0	71%

Table 8. Top: results of the Believe Survey for the Out-of-School Program "After-School Camp". Bottom: Results of the Believe Survey for the Out-of-School Program "Summer Camp". For each program, the % of survey responses that were "positive" (a 4 or 5 on a scale of 1-5) is shown. The same % and average response for each Believe goal is also shown.

Ocean Leader Programs

	Total	I Believe I Can Have A Career In Science		I Believe I Can Do Science		I Believe Science Is Important		I Believe Science Is Relevant		I Believe I Can Use Science To Make A Difference		I Believe That I Have A Growth Mindset	
Program	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)	Avg. Response (1-5)	% of Responses Positive (>3 of 5)
OL Bridge	70%	3.9	63%	3.8	63%	3.8	58%	3.7	63%	4.0	75%	4.7	100%
OL Intro to Research	81%	4.0	62%	4.1	81%	4.2	79%	4.0	71%	4.6	93%	4.7	98%
Total	**75%**	**4.0**	**62%**	**3.9**	**72%**	**4.0**	**68%**	**3.9**	**67%**	**4.3**	**84%**	**4.7**	**99%**

Table 9. Results of the Believe Survey for Ocean Leader Programs. For each program, the % of survey responses that were "positive" (a 4 or 5 on a scale of 1-5) is shown. The same % and average response for each of the five Believe goals is also shown.

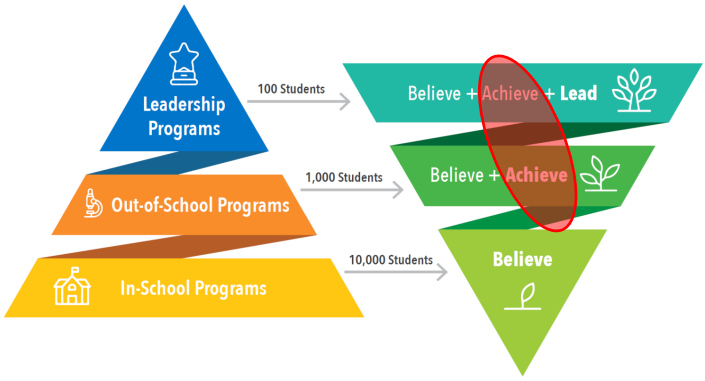
Discussion

- **Communication Points: Although less than 1% of their peers nationwide with similar socioeconomic demographics are working in science-related careers, 70% of students in the In-School Program showed "positive science belief" on the Believe Survey in the 2023-2024 school year.**
- **We saw an increase by 15 percentage points in overall positive science belief from students in the In-School Program from the previous year (55% to 70%).**
- The increase in positive science belief in the In-School Program may be explained by a few factors:
    - For the first time, we surveyed 2nd grade students. Students in this grade level expressed a strong sense of positive science belief.
    - 6th grade students did not complete the Believe Survey (they were administered an incorrect version of the survey). As middle school students have historically expressed a lower sense of positive science belief, this lack of 6th grade results may have skewed the overall results in a positive direction.
    - 7th and 8th grade both saw substantial increases compared to the previous school year (17% and 14%, respectively). This may be explained by:
        - Enough time passing since program disruptions from COVID-19 to allow for a cumulative effect on student belief. A longitudinal analysis of middle school Believe Survey results found that students who had participated in three or more consecutive years of programming expressed a higher sense of positive science belief, compared to students with only one or two years of non-disrupted programs. For example, this 8th grade cohort was the first grade level to have participated in our middle school program consecutively in 6th, 7th, and 8th grade.
        - Strategic meetings with middle school teachers to gather feedback used to implement changes to program activities, including more hands-on experiences and an additional inquiry experiment for each grade level.
- We saw identical overall positive science belief of 70% for both In-School Programs and After-School Camp.
- In Out-of-School Programs, the overall positive belief was lower in Summer Camp (67%) compared to After-School Camp (70%).
- In Out-of-School Programs, the overall positive science belief was lower in Spring semester (65%) compared to Fall semester (75%).

Quantitative: Achievement

Introduction

Our goal in Out-of-School and Ocean Leader Programs is that students achieve in science through improved understanding of scientific concepts and the scientific process as well as achievement of positive academic performance in school.



Consistent academic achievement in grades K-12 is a key determinant in a young person's ability to attend college, receive a science or science-related degree, and obtain careers in science and related fields. However, science test scores of students of color and from low socio-economic status communities lag far behind those of Caucasian students and students from more affluent areas (Irwin et al., 2022). In 2018, 86% of the 11th graders at Hoover High School (the high school served by Ocean Discovery) did not meet state math test standards. Furthermore, learning loss related to the COVID-19 pandemic has been widely documented (NAEP 2023); for 4th graders, average reading and math scores in 2022 declined 5 points in reading and 7 points in mathematics compared to 2020. This is the largest average score decline in reading since 1990. Decreases were greatest amongst students historically furthest from opportunity. In mathematics, Black students' 13-point score decrease, along with White students' 5-point decrease, resulted in a widening of the score gap from 25 points in 2020 to 33 points in 2022. In 2022, Hispanic students in the 25th percentile (lower performance levels) experienced a 9-point reading decrease and a 12-point decrease in math.

Methods

Report Card Grades and GPA:

Through our data sharing agreement with San Diego Unified School District, we are provided with grade level-specific academic data on a semester basis for all students in Kindergarten through 12th grade in the school-shed. These data include the following:

- **Kindergarten through Grade 5**: Individual course grades
- **Grades 6 through 8**: Individual course grades, cumulative GPA
- **Grades 9 through 12**: Individual course grades, weighted cumulative GPA

Report card grades and GPA are analyzed twice per year: at the end of the first grading period for a particular grade level (note that middle schools are on a different grading schedule than elementary and high schools), and at the end of the academic year.

Analysis includes the following:

- Control Group: average report card grades and GPAs are calculated for all students in the school-shed who did not participate in Out-of-School or Ocean Leader Programs.

- Experimental Group: average report card grades and GPAs are calculated for students who participated in Out-of-School or Ocean Leader Programs.

Standardized Test Scores

SDUSD annually administers two grade-specific standardized tests. The California Science Test (CAST) is a standardized test based on Next Generation Science Standards (NGSS) and is administered in grades 5, 8, and once in high school in either grade 10 or 11. The California Assessment of Student Performance and Progress (CAASPP) includes a Smarter Balanced Summative Assessment (SBA) for Mathematics and is administered in Grades 3 through 8, and in Grade 11. Data for the school-shed are summarized in reports generated by SDUSD by achievement level ("Standard Not Met", "Standard Nearly Met", "Standard Met", "Standard Exceeded") and represent the number and percentage of students that were classified in each of these achievement levels based on the accuracy of their responses on each of the standards-based tests.

We track and summarize, as applicable, the annual results of the standardized test scores for the school-shed using the reports prepared by SDUSD. We also collect the same standardized test score data from a control group of schools within SDUSD that are not in our school-shed. This control group was determined using publicly-available data from the California Department of Education; we selected the group of non-school-shed schools within SDUSD that had the most similar socioeconomic (income and ethnicity) demographics to our school-shed.

We analyzed standardized test score data from 5th and 8th grade students during the 2023-24 school year.

Results

Out-of-School Programs

Report Card Grades: Grades K-5

Grading Period	OS Math Grade	Control Math Grade	OS Science Grade	Control Science Grade	OS English Grade	Control English Grade
1	2.26	2.24	2.66	2.59	2.07	2.10
4	2.53	2.47	2.79	2.75	2.43	2.33

Table 10. Average report card grades for the Out-of-School Program's participating elementary school students compared to the control group. Grades are calculated on 1-4 scale, with 1 representing "Beginning progress towards grade level expectations" and 4 representing "Exceeding grade level expectation".

Report Card Grades: Grades 6-8

Grading Period	OS Math Grade	Control Math Grade	OS Science Grade	Control Science Grade	OS English Grade	Control English Grade
2	2.25 / C	2.07 / C	2.78 / B-	2.34 / C+	2.56 / C+	1.99 / C-
4	2.48 / C	2.25 / C	2.69 / C+	2.28 / C	2.47 / C+	2.05 / C

Table 11. Average report card grades for the Out-of-School Program's participating middle school students compared to the control group. Grades are calculated on a traditional A-F level, and converted here where A=4, B=3, C=2, D=1, and F=0. An approximate letter grade is included next to each average grade.

GPA

Grading Period	OS GPA	Control GPA	p-value
1	2.70	2.55	0.32 (not significant)
4	2.72	2.50	0.07 (not significant)

Table 12. Average GPAs for the Out-of-School Program's participating middle school students compared to the control group. GPA is calculated on a 0-4 scale. The p-value from a T-Test is included to show statistical significance.

Ocean Leader Programs

Report Card Grades

Grading Period	OL Math Grade	Control Math Grade	OL Science Grade	Control Science Grade	OL English Grade	Control English Grade
1	2.56 / C+	2.02 / C	3.13 / B	2.68 / C+	3.01 / B	2.53 / C+
4	2.35 / C+	1.89 / C-	2.93 / B-	2.48 / C+	2.81 / B-	2.32 / C+

Table 13. Average report card grades for the Ocean Leader Program's participating high school students compared to the control group. Grades are calculated on a traditional A-F level, and converted here where A=4, B=3, C=2, D=1, and F=0. An approximate letter grade is included next to each average grade.

Grading Period	Ocean Leader GPA	Control GPA	p-value
1	3.04	2.60	P<0.001 (significant)
4	3.04	2.63	P<0.001 (significant)

Table 14. Average GPAs for Ocean Leader students compared to the control group. GPA is calculated on a 0-4 scale. The p-value from a T-Test is included to show statistical significance.

Standardized Test Scores

In the 2023-24 school year, more students at our participating schools either met or exceeded all standards compared to students at the control schools (Fig. 2). Additionally, fewer students at our participating schools tested in the category of "Standard Not Met" compared to students at the control schools (Fig. 2).

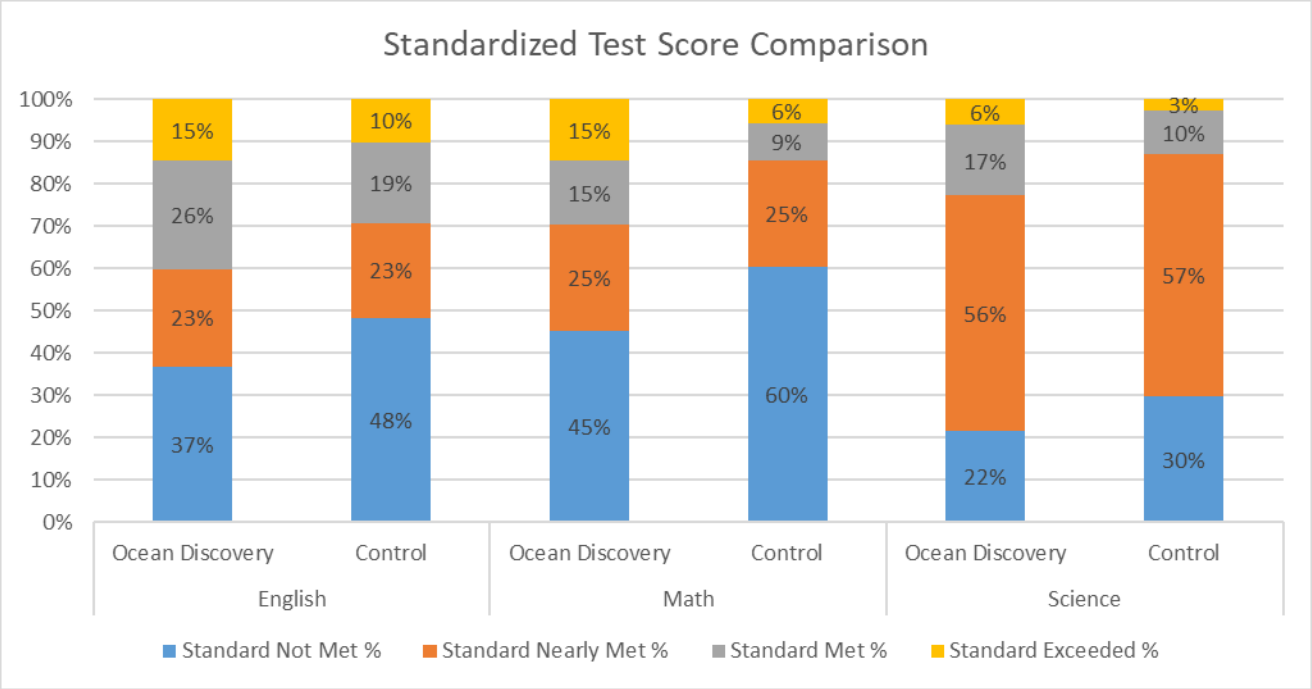


Figure 2. Mean standardized test scores, shown as a percentage of students who either did not meet, nearly met, met, or exceeded the subject standard, in English, math, and science for schools in the Ocean Discovery school-shed and a control group of schools within SDUSD.

In 2023-24, students at our participating schools scored 38% higher on math, science, and English standardized test scores (p=0.04) compared to their peers at non-participating schools with similar socioeconomic demographics (Figure 3).

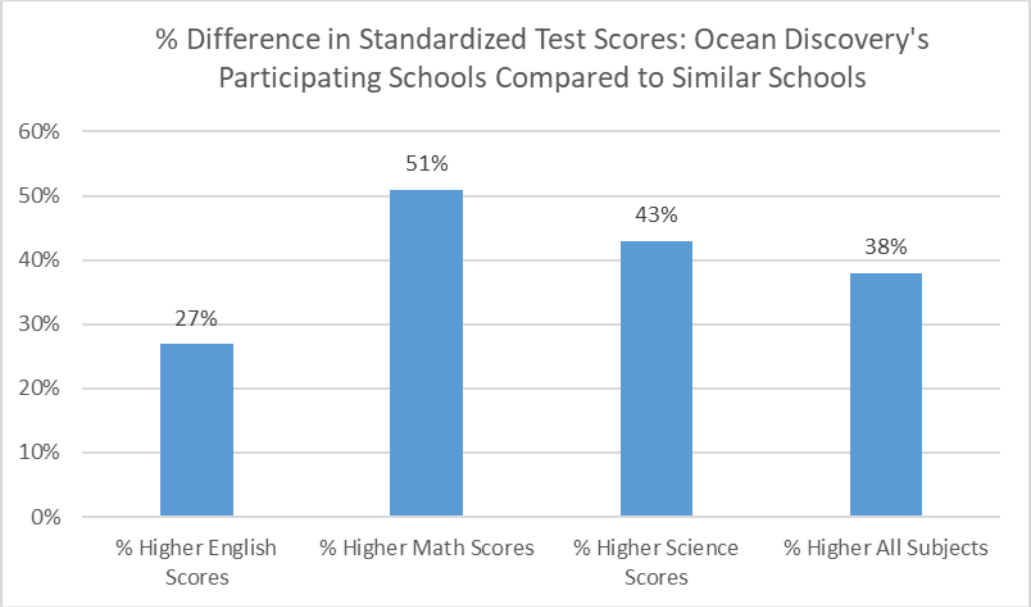


Figure 3. Difference in standardized test scores between students at schools in the Ocean Discovery school-shed compared to a control group within SDUSD. The Ocean Discovery schools scored higher for all subjects.

Discussion

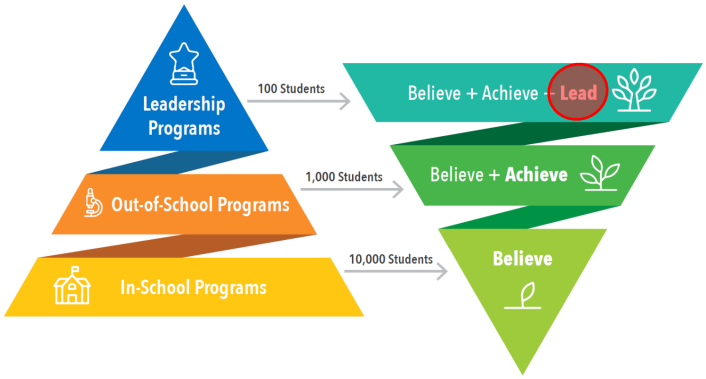
- **Communication Points:**
  - **The average math, science, and English report card grades for elementary school students participating in our Out-of-School programs was slightly higher than their peers at school who did not participate in the program.**
  - **The average math, science, and English report card grades for middle school students participating in our Out-of-School programs was higher than their peers at school who did not participate in the program.**
  - **The average GPA for middle school students participating in our Out-of-School programs (2.72) was higher than their peers at school who did not participate in the program (2.50). Though not statistically significant, a p-value of 0.07 indicates a strong trend.**
  - **The average math, science, and English report card grades for the high school "Ocean Leaders" participating in our Ocean Leader Programs was higher than their peers at school who did not participate in the program.**
  - **Our Ocean Leaders averaged a B- on their science and English report cards, compared to a C for their peers at school.**
  - **The average GPA for high school Ocean Leaders (3.04) was higher than their peers at school who did not participate in the program (2.63), a statistically significant difference.**
  - **The average GPA of all Ocean Leaders (3.04) was higher than in the previous school year (2.79).**

- **In the Hoover Cluster schools served by our In-School Programs, students scored 38% higher on math, science, and English standardized test scores (p=0.02) compared to their peers at non-participating schools with similar socioeconomic demographics.**

Quantitative: Leadership

Introduction

Our Ocean Leader Programs pair rigorous science programming and experiences with college and career support services in order to develop young people into science leaders who make a difference in their community and our world. This program builds upon the other program tiers and uniquely also provides the practice of soft skills and practical tools for college and career.



In order to main our country's position as world leaders in science and innovation, our science workforce needs increased representation from individuals from the socioeconomic backgrounds of our students. However, these students are less likely to pursue the higher education necessary for science- and technology-based careers (Pew Research Center, 2021). As a result, the United States' scientific workforce does not reflect the population of the nation as a whole; for example, Hispanic individuals represent 18.9% of the U.S. population, but only 8% of jobs in science, technology, engineering, and math fields (Pew Research Center, 2021).

Through our Ocean Leader Programs, we provide a foundation upon which our students are empowered to lead by taking the necessary steps to pursue and obtain a career in science or science-related fields, taking opportunities to use science to make a difference, and participating as science leaders and mentors.

Methods

The progress of our Ocean Leaders, from initial participation in our programming through college and career, is tracked so that we can provide targeted supports to our students as well as share their successes with the community, our partners, and beyond. Tracking data such as high school graduation date, college attendance and graduation data, major, and career progression are maintained in our program management database. Additionally, we alumni participation in all Ocean Discovery programs and volunteer activities. These data allow us to determine the extent of the impacts our programming is having on our students now and into the future.

Our post-high school tracking data are obtained through three primary sources: program and volunteer attendance data, annual Ocean Leader alumni surveys, and National Student Clearinghouse data. Alumni surveys are emailed to all alumni and request updates on their career progression with particular emphasis on science-related milestones. National Student Clearinghouse (NSC) data for Hoover High School graduates are obtained via subscription to the NSC service, and allow us to track all graduates' college entry and progression, including for our Ocean Leaders. The NSC data also allow us to calculate baseline metrics for college matriculation and graduation, and science/related major completion for Hoover High School graduates, providing data for a comparison group as well as for our Ocean Leaders.

Results

Ocean Leader Enrollment in Higher Education, Class of 2024

# of Graduates	% Enrolling in Higher Education	% Enrolling in a 2-Year Institution	% Enrolling in a 4-Year Institution	% Not Enrolling in Higher Education
6	100%	33%	67%	0%

Table 15. Enrollment in higher education by graduating 12th grade Ocean Leaders, including in 2-year and 4-year institutions.

Hoover High School Enrollment in Higher Education

Graduating Class	# of Graduates	% Enrolling in Higher Education	% Enrolling in a 2-Year Institution	% Enrolling in a 4-Year Institution	% Not Enrolling in Higher Education	% Graduated College
2022	440	64%	40%	24%	36%	NA
2023	471	53%	42%	10%	47%	NA
2024	464	47%	36%	11%	53%	NA

Table 16. Enrollment by graduating 12th grade students from Hoover High School, including in 2-year and 4-year institutions.

High School Cohort Year	Number of Alumni	Attended Higher Ed	Currently Enrolled in College	Currently Pursuing Science & Related Degree	Eligible to Graduate College*	Receieved Higher Ed Degree	Received Bachelors	Received Associates or Professional Certificate	Received Science or Related Degree	Received Masters	Received Doctorate	Career Field Known	In Science & Related Careers
2005	11	10	0	0	11	5	5	0	4	2	0	4	2
2006	12	9	0	0	12	7	7	0	6	1	1	5	5
2007	14	11	2	0	14	6	6	0	4	3	1	6	5
2008	11	11	0	0	11	10	8	2	6	3	0	9	6
2009	10	9	0	0	10	7	5	2	6	1	0	7	5
2010	13	12	0	0	13	7	7	0	5	1	0	12	6
2011	9	8	0	0	9	7	6	1	4	0	0	5	4
2012	9	8	1	0	9	6	3	3	4	0	0	3	2
2013	9	9	0	0	9	5	5	0	4	1	0	5	3
2014	6	5	0	0	6	3	2	1	2	0	0	2	1
2015	12	9	1	1	12	5	5	0	4	0	0	8	5
2016	5	4	0	0	5	1	1	0	1	0	0	4	1
2017	8	7	1	0	8	3	1	2	2	0	0	5	1
2018	10	10	3	2	10	2	2	0	2	0	0	3	2
2019	15	15	4	2	5	5	5	0	4	0	0	4	1
2020	12	12	5	2	1	1	1	0	1	0	0	2	1
2021	7	5	2	2	0	0	0	0	0	0	0	1	0
2022	6	6	4	2	2	2	0	2	1	0	0	1	0
2023	10	10	7	3	0	0	0	0	0	0	0	0	0
2024	5	5	4	1	0	0	0	0	0	0	0	0	0
Totals	**194**	**175**	**34**	**15**	**147**	**82**	**69**	**13**	**60**	**12**	**2**	**86**	**50**
Percentages	-	**90%**	**18%**	**44%**	-	**56%**	**47%**	**9%**	**73%**	**8%**	**1%**	-	**58%**

*Table 17. College enrollment, college graduation, and career status information for Ocean Leader Alumni by high school cohort year. *Eligible to graduate college is defined as the following: students who either a) graduated high school 6 or more years ago; b) graduated high school between 4-6 years ago and are no longer enrolled in college; or c) graduated high school within the past 6 years and graduated college. The percentage of college graduates is calculated as (# of College Graduates / # Eligible to Graduate College). The percentage in science & related careers is calculated as (# in Science & Related Careers / # Career Field Known).*

Ocean Leader Alumni Volunteering

# of Eligible Alumni*	# of Alumni Volunteering	% of Alumni Volunteering
139	7	5%

*Table 18. Number and percentage of eligible alumni who volunteered with the organization. *Eligible alumni = graduated high school 6 or more years ago.*

Ocean Leader Alumni Donating

# of Eligible Alumni*	# of Alumni Donating	% of Alumni Donating
139	27	19%

*Table 19. Number and percentage of eligible alumni who donated financially to the organization. *Eligible alumni = graduated high school 6 or more years ago.*

Discussion

- **Communication Points:**
  - **100% of graduating 12th grade students enrolled in higher education, compared to 47% of their peers in their high school graduating class.**
  - **56% of Ocean Leader alumni have earned a college degree, compared to 13% of their peers nation-wide from similar socioeconomic backgrounds.**
  - **73% of Ocean Leader alumni graduates majored in a science or science-related field. In comparison, in 2021, only 15% of all STEM degrees received nationwide were awarded to people of color.**
  - **58% of Ocean Leader alumni currently have jobs in science or science-related fields, compared to 1% of their peers nation-wide from similar socioeconomic backgrounds.**
  - **19% of Ocean Leader alumni give back to the organization as donors.**
  - **12 Ocean Leader alumni have received Master's degrees and 2 have received Doctorate degrees.**
- The percentage of Ocean Leader alumni who earn a college degree (56%) is lower than in last year's evaluation report (59%). This is likely because an additional pool of approximately 60 alumni, who had previously not been included in our student information system, were added to this system and included in our data analysis via the National Student Clearinghouse.
- The percentages of Ocean Leader alumni who volunteer with the organization or give financially both decreased substantially from the previous year. This decrease can also be attributed to the additional pool of alumni added to our student information system (as noted above).
- The percentage of all Hoover High students enrolling in higher education decreased for the 2nd consecutive year (from 64% to 53% to 47% from 2022 to 2024).
- College and career data are fluid, and percentages can increase and decrease annually. Some students who are not currently enrolled in college will re-enroll and eventually graduate.

Qualitative: Alignment With Education Foundation

Introduction

Our Education Foundation guides all of our programming. It provides the foundation upon which we set programmatic goals, design and implement curricula, and evaluate impacts. The Education Foundation outlines the strategies (Design Principles) we use for each of our broad educational initiatives as well as describes what the ideal state of these strategies is when implemented (Design Principle Benchmarks). When our design principles are optimally implemented in our programs, it is hypothesized that our programs will have the maximum positive impact on our students. Education Foundation alignment is, therefore, both a forward-looking and a backward-looking process. We intentionally develop our programs so that they specifically address our design principles (forward-looking), and then periodically evaluate our implemented programs against our design principles (backward-looking) to ensure the programs are meeting the specific criteria described in our Education Foundation. The results of this evaluation drives future enhancements (Fig. 2). This cyclical process ensures that we stay true to our unique educational approach and that our approach is effective.

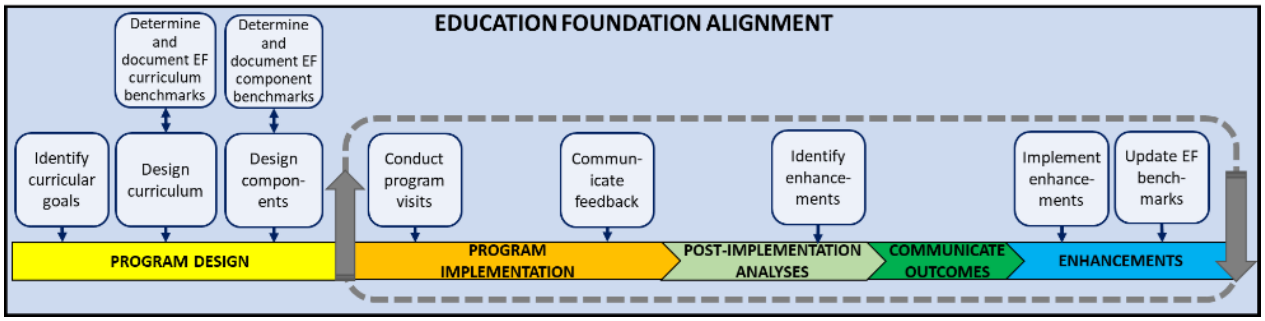


Figure 3. The Education Foundation Alignment Cycle. The Education Foundation alignment is forward-facing and backward-facing. Curricula and related components are designed to specifically address the fundamental organizational philosophies and programmatic design principles outlined in the Education Foundation. Program visits are conducted periodically to assess the curriculum and its instruction and to provide constructive feedback. This feedback is used to guide programmatic enhancements and the Education Foundation benchmarks for the program are updated, as necessary.

Methods

- Two program observations for Education Foundation Alignment were conducted:
  - October 2023, In-School 9th Grade Program
  - January 2024, Out-of-School After-School Camp

Results

- The programs were determined to be in overall alignment with the Education Foundation. Minor enhancements were identified, discussed, and implemented following the observations.

Qualitative: Stakeholder Feedback

Introduction

Feedback from program stakeholders is a valuable data source that informs the effectiveness of our programming. Currently, we define two types of stakeholders:

1) Teachers: partner K-12th grade teachers within our school-shed who opt-in to participate in In-School Programs.
2) Families: parents or other family members of students who participate in Out-of-School Programs.

Methods

- Teachers:
    - Teacher surveys were offered to every teacher participating in the In-School Program. Typically, surveys were offered when classes visited the Living Lab.
    - Surveys were administered via a Google Form accessed on a tablet.
    - Survey questions included:
        1. Please describe one or more aspects of this year's program that you believe were positive for your students' experience.
        2. Please describe one or more aspects of this year's program that you think could be improved.
        3. Our primary goal for this program is that your students will BELIEVE that science is something they can do and a scientist is someone they can be. In your opinion, what percentage of your students do you think hold this "Belief"?
        4. Please rate your overall experience in the program this year (1 = negative, 5 = positive)
        5. Do you have any additional comments or feedback you would like to share?
- Families:
    - Family surveys were offered on the 5th and final day of After-School and Summer Camp.
    - Surveys were administered via paper copies.
    - Survey questions included:
        1. How happy are you with your child's experience in the ODI program? (1-5)
        2. Does your child feel better about science after completing this program? (1-5)
        3. Can you share one example of how this program has helped your child?
        4. Do you have any suggestions to improve the program?
        5. What is one thing ODI could do to help your child do better in school?

Results

Teachers

- 119 teachers completed a survey.
- Survey responses were read and trends were pulled out and grouped for each question, both within and across grade levels.
- Detailed responses by grade level were provided to the In-School Program Manager. A summary of trends by question is as follows:
    1. Please describe one or more aspects of this year's program that you believe were positive for your students' experience.

- The feedback from teachers about this year's program was overwhelmingly positive, highlighting several key aspects that enhanced students' experiences:
    1. Hands-On Learning: Teachers appreciated the hands-on activities, including engineering projects, planting native species, and interactive science experiments. These activities helped students engage deeply with scientific concepts.
    2. Field Trips and Real-World Connections: Field trips to locations like the Living Coast Discovery Center and La Jolla Cove allowed students to see and experience natural habitats firsthand. Teachers noted that these experiences helped students connect classroom learning with real-world applications, enhancing their understanding and excitement.
    3. Career Exposure: Many teachers valued the connection to scientific careers, with students having opportunities to meet and interact with scientists. This exposure broadened students' perspectives on potential future careers and helped them see science as a tangible, impactful field.
    4. Environmental Awareness: Teachers observed that activities focused on environmental issues, such as conservation, pollution, and climate change, made students more aware of their role in protecting their community and environment.
    5. Student Engagement: The program's structure, combining classroom lessons with field trips and lab visits, kept students highly engaged. The diverse activities, like solo hikes, microscope work, and VR experiences, catered to various learning styles and made learning dynamic and memorable.
- Overall, teachers felt that these elements collectively contributed to an enriching educational experience, helping students build knowledge, curiosity, and a sense of responsibility toward their environment.

2. Please describe one or more aspects of this year's program that you think could be improved.
    - Here's a summary of teachers' suggestions for improving the program:
        1. Structure & Time Management: More strategic group placements (e.g., by ability or learning needs) and clearer instructions on grouping students would be helpful. Reduce lengthy segments of direct instruction or sitting time, especially for younger students, and increase hands-on or interactive activities. Adjust field trip timing; some parts felt too short (e.g., aquarium time) or too long (e.g., lunch).
        2. Enhanced Student Engagement: Include more movement breaks and kinesthetic activities, particularly for younger students and those with ADHD or autism. Introduce consistent attention-getting cues and age-appropriate engagement techniques during presentations.
        3. Additional Visuals & Language Support: Use more visuals, sentence starters, and translated materials to support English learners and students with reading difficulties. Provide resources or activities that introduce animals or specific concepts before field trips.
        4. Content & Activity Suggestions: Increase opportunities for hands-on activities, like building or creating models, and incorporate local comparisons or relevant topics. Explore offering grade-level assessments or written activity connections to better integrate learning.
    - Overall, teachers appreciate the program but feel these adjustments could enhance student learning and engagement.

3. Our primary goal for this program is that your students will BELIEVE that science is something they can do and a scientist is someone they can be. In your opinion, what percentage of your students do you think hold this "Belief"?

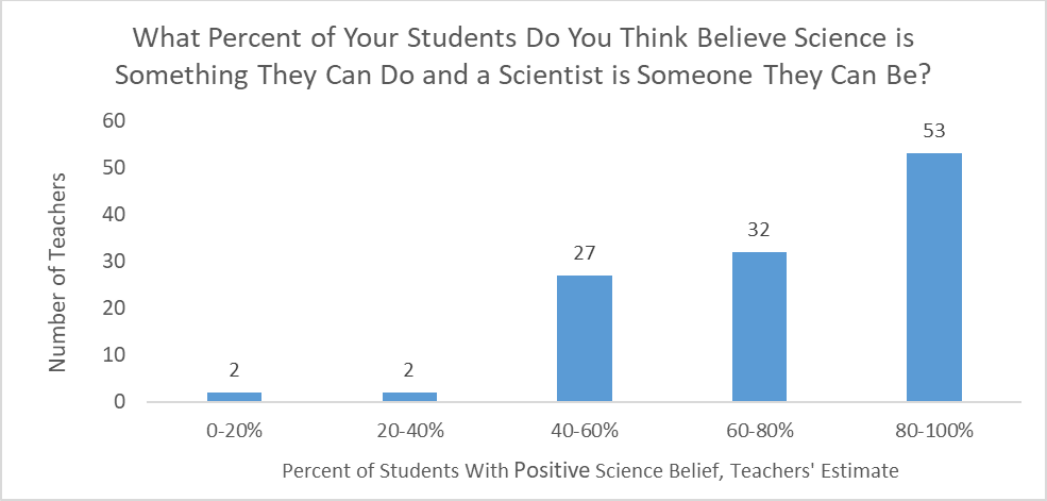


Figure 4. Teachers' estimate of percentage of their students who hold the belief that science is something they can do and a scientist is someone they can be.

4. Please rate your overall experience in the program this year (1 = negative, 5 = positive)
   - The average teacher rating was 4.65 out of 5.
   - 95% of teachers had a favorable experience (rating of 4 or 5 out of 5).
   - 5% of teachers had a neutral experience (rating of 3 out of 5).
   - 0% of teachers had a negative experience (rating of less than 3 out of 5).

Families

- 81 parents completed a survey.
- Survey responses were read and trends were pulled out and grouped for each question.
- Detailed responses were provided to the Out-of-School Program Manager.
- A summary of results and trends by question is as follows:
  1. How happy are you with your child's experience in the ODI program? (1-5)
     - Average response: 5 out of 5
  2. Does your child feel better about science after completing this program? (1-5)
     - Average response: 5 out of 5
  3. Can you share one example of how this program has helped your child?
     - Families shared that the program has significantly benefited their children in various ways:
       1. Increased Interest in Nature and Science: Many children expressed newfound enthusiasm for topics like marine life, ocean animals, and nature. They enjoyed

learning about sea creatures, insects, and even environmental issues like invasive plants.
2. Boosted Confidence and Social Skills: Parents noted that their children were more confident, eager to socialize, and engaged in teamwork. The program encouraged them to interact with peers, form friendships, and feel more comfortable speaking with others.
3. Learning and Curiosity: The hands-on activities and experiments stimulated children's curiosity, leading them to ask questions and share what they learned with their families. The exposure to science made many children eager to continue exploring these subjects.
4. Improved Independence and Motivation: Several parents observed that their children became more independent, motivated, and open-minded. Some kids even overcame fears and showed greater self-assurance in their activities.

4. Do you have any suggestions to improve the program?
   - The feedback from families about the program for their child is overwhelmingly positive. Most parents had no suggestions for improvements, expressing that they were happy with the program as it is. However, a few suggestions included:
     1. Offering the program more frequently, possibly extending it to more weeks or additional sessions throughout the year.
     2. Providing more advance notice about events, perhaps through a brochure or newsletter with details on activities and logistics.
     3. Adding dissections, which were particularly enjoyed by some students.
     4. Some suggestions to improve logistics.
     5. Increasing visibility of the program to help more families learn about it.
   - Overall, families appreciate the program's content and the experiences it offers their children.
5. What is one thing ODI could do to help your child do better in school?
   - Families provided the following feedback on how Ocean Discovery could help their child do better in school:
     1. Increased Frequency and Duration: Many families suggested offering the program more often, with some recommending weekly or monthly sessions or extending the camp duration to multiple weeks. This frequency would enhance learning consistency and engagement.
     2. Tutoring and Academic Support: Several families emphasized the need for tutoring, especially in reading, homework assistance, and specific areas where their children face challenges in school.
     3. Confidence and Social Interaction: Parents noted that the program helps build confidence and fosters teamwork. They appreciated opportunities for their children to interact with staff and other students, which supports personal growth and a sense of belonging.
     4. Continued School Outreach and Follow-ups: Families expressed interest in regular school visits, follow-up sessions, and school-based activities to reinforce learning and involve more students.
     5. Real-World Learning and Curiosity: Parents valued hands-on experiences like field trips, which they felt sparked their children's curiosity and interest in subjects like science and environmental stewardship.

Discussion

- **Communication Points:**
  - **Teachers expressed overwhelmingly high satisfaction with the program in 2023-24.**
  - **Positive feedback from teachers mentioned hands-on activities, opportunities for kids to learn outside in nature, and meeting science role models who are representative of student backgrounds.**
  - **Families expressed unanimously high satisfaction with the program in 2023-24.**
  - **Positive feedback from families mentioned how much their kids have learned about science and marine life, and how excited they are to attend the program. Families feel the program is helping their kids in school as well as to help make new friendships.**
  - **Highlighted teacher quotes include:**
    - ***"I think Ocean Discovery is one of the best programs I have worked with in my 10 years of teaching. I appreciate how you are always improving and growing as a program."***
    - ***"I want to thank your program designers and team leaders for your patience and enthusiasm. The children are so happy whenever they come. I truly believe that these experiences make a difference in their future."***
    - ***"The instructors are so knowledgeable, kind, and really care about the students they work with. The whole staff is friendly and welcoming. We appreciate all that this program offers!"***
    - ***"Love love ODI field trip for my kiddos! Thank you so much for all the staff for being patient and kind to all my students. It is much appreciated! Look forward to next year!"***
    - ***"Exposing students to climate change is important. Science and math are important, but so is having agency to effect change. These students need to learn how to use their voice and political power to change policies that allow our community to thrive."***
    - ***"This was the best field trip to the tide pool we have ever had! The kids really enjoyed it, and having lunch before made a big difference. Thank you for all you do!"***
    - ***"I am so very grateful for this program and what it offers for the community and the world at large."***
    - ***"I love having my class be part of Ocean Discovery. The effort the staff put into preparation and, most importantly, their care for our students, is incredible. It is always a pleasure being part of this program."***
    - ***"All the ODI teachers, guides, and support staff were amazing! They knew a lot about the learning and how to engage students. All my students loved working with them! Thank you for this wonderful opportunity!"***
    - ***"This experience is priceless for the students."***
    - ***"Thank you for your passion in working with the community."***
    - ***"The teachers were awesome and engaging. The kids loved their experiences at ODI."***
  - **Highlighted parent quotes include:**
    - ***"My child has come home very confident about her time here and her experience with nature. She loved the time she spent here."***

- ***"He was enthusiastic about learning about Kumeyaay culture and taught us all about it. It helped him notice things he wouldn't otherwise notice outdoors."***
- ***"Ruby is confident in sharing her science knowledge with others!"***
- ***"This program has provided beneficial learning time with experiments and hands-on activities, keeping both my kids motivated and excited."***
- ***"He has loved the time with new friends and actually tells me about the activities – also asked to sign up for more science camps."***
- ***"My 2 kids come out of the program happy, excited, and eager to come back. They talk to each other about their day and remember some of the topics discussed."***
- ***"My son has come home every day excited about all the fun he has had; with him being autistic, it was an amazing experience to share with some of his classmates."***
- ***"It has helped her to be more independent and have more confidence when she does things."***

Qualitative: Alignment With Educator Principles

This evaluation mechanism is currently under development and is expected to begin during the 2024-25 school year.

DISSEMINATION

We incorporate data and key takeaways into a variety of other dissemination materials. Our organizational Annual Report discusses our achievements and is distributed broadly through our networks. We also share outcomes on our website, to funders, and to all partners who provide support for our programs and students.