

PURPOSE STATEMENT

1. **Issue** – Science, Math, Engineering and Computer Science classes in high school and college that lead to in-demand STEM careers are often underrepresented of Black, LatinX, Female and LGBTQ youth populations. Research from the literature has shown that this gap primarily stems from a lack of personal connection between middle school students and near-peers in high school and college that are successful in these fields and represent their own communities.
2. **Vision** – The Propel program engages high school students as mentors who facilitate creative design-based activities for middle-school students—from creating their own fizzing bath solutions to building Mars landers. The program is designed to provide engaging, supportive, and equitable pathways into STEM classes and careers, centering on students from non-dominant groups, including Black, LatinX, female and non-binary students. The program leverages the creativity and knowledge that students from non-dominant groups already possess so that they feel more confident experimenting and exploring design-based STEM activities while making connections to professional opportunities in STEM fields.
1. **Approach** – IDEA instructor Jaleesa Trapp and co-director Zach Varnell have designed the Propel program in partnership with the Media Lab at MIT, where Ms. Trapp’s doctoral research in non-dominant youth in STEM fields led to a year-long funding opportunity through Foundation for Tacoma Students over the 2020-21 school year to develop the curriculum through an extended learning opportunity (ELO) at three middle schools. Our approach is to expand this program by embedding the STEM classes into the school day at four participating middle schools, co-taught by high school mentors from SAMI and IDEA and supervised by pre-service instructors in partnership with the University of Washington, Tacoma. This approach will greatly expand the access to these programs along with providing further opportunities to hire pre-service teachers from these representative groups.

STAKEHOLDERS

- 7th and 8th grade students at four pilot middle schools for the 2021-22 and 2022-23 school years.
- High school mentors from SAMI, SOTA and IDEA
- Pre-service teacher candidates
- Applicants to STEM majors at local colleges like UW Tacoma and PLU.

CASE STATEMENT

The Propel program was initiated in 2017 at IDEA to address the disproportionately low rate of female students applying to the STEM-focused high schools in Tacoma Public Schools. Between 2017 and 2019, 33% of the applicants to the two STEM-focused high schools identified as female. In 2019, through a grant from Foundation for Tacoma Students, Propel expanded to include all students from non-dominant groups (Black, LatinX, non-binary, and LGBTQ youth). Propel was co-developed by working closely with high school students as co-designers and mentors of project-based activities for middle-school students. The program was first prototyped as a summer and winter program, then expanded to a full-

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year course as an extended learning opportunity (ELO) at Mason Middle School, Stewart Middle School, and Giadrone Middle School. Propel served over 50 middle school girls in it's first two summers as a summer camp and regularly served over 100 non-dominant youth in three participating middle schools as an ELO.

Jaleesa Trapp has guided the iterative design of the Propel program to develop equitable pathways into STEM classes and careers, building on her research as a graduate student in the Lifelong Kindergarten group at MIT in Boston. Her work is informed by her experience growing up attending Tacoma Public Schools as well as her experience as an educator, including serving for the past five years as a high-school Computer Science teacher in Tacoma Public Schools. In her Masters thesis, she documents the contrast between her experience as a middle-school student attending science class--which emphasized rigidly following rules (with constant threat of disciplinary action) to the after-school environment of the Tacoma Computer Clubhouse that she attended, which encouraged exploration, experimentation, peer learning, and mentorship. In the design of the Propel program, Trapp is building on the Clubhouse learning approach, adapting the mentoring model to work across middle and high-schools in order to greatly expand opportunities for young people from non-dominant groups to become designers and innovators in STEM.

WHAT SPECIFIC BOARD-ADOPTED BENCHMARKS WILL BE INFLUENCED BY THIS WORK?

1. Academic Excellence: Academic Rigor – Enrolling more non-dominant youth in rigorous STEM courses like Engineering, Computer Science and AP Math and Science Courses in High School
2. Academic Excellence: Math Competencies – Increasing academic performance of non-dominant youth in math applied math courses in high school
3. Academic Excellence: Industry Certifications – earning more industry recognized certificates in computer science, engineering, and CTE STEM classes in high school for non-dominant youth

MEASURABLE GOALS

1. We will increase enrollment in AP Computer Science classes in high school from 23% non-white in 2020 to 45% non-white in 2023 as measured by enrollment in AP Computer Science classes.
2. We will increase enrollment in CTE Advanced Engineering classes from 42% non-white in 2020 to 62% non-white in 2023 as measured by enrollment in CTE Advanced Engineering classes.
3. We will increase enrollment in College in the High School and AP Design and Art Classes from 32% in 2020 non-white to 52% non-white in 2023 as measured by enrollment in College in the High School AP Design and Art classes.

SCOPE OF WORK

Inputs / Resources	Activities	Outputs / Outcomes
High School Propel Mentors	Guided by a certificated Propel instructor at SAMI and IDEA, students will practice mentorship and teaching skills based off of the	25 students at SAMI and IDEA will be enrolled in the first year as mentors, distributed in pairs to four middle school classes (one at each participating middle school) throughout the

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	Careers in Education class curriculum.	Spring Semester after successfully completing the intro to Propel Mentoring class in the Fall. Goal is to expand this to two classes (for a total of 50 mentors) and eight middle school classes in 2022-23.
Middle School Propel Students	Students will be enrolled in either one Propel STEM Methods class or Propel Electronic Music class at four participating middle schools, following a curriculum developed with MIT’s Media Lab. The class will be a semester-long and will include hands-on, project-based lessons with accompanying video lesson by MIT staff and guided by a pre-service teacher and two high school mentors. The class will be during the school day, in the student’s schedule and will be supervised by a pre-service teacher as part of the Propel program.	15 students at each participating middle school will be enrolled in each class (Propel Methods and Propel Electronic Music) for a total of 30 students at each school. With four participating middle schools, 120 students will be served each semester. The goal will be to expand to two classes each, or 240 students enrolled in Propel classes at the four participating middle schools in Year 2.

- Barriers to more equitable outcomes include recruiting middle school students to enroll in Propel programs and working with teachers in 6th and 7th grade science and math classes to encourage non-dominant youth to enroll.
- To mitigate these barriers, we will work with propel mentors in the Fall of 2021 to visit 7th grade science classes and encourage students to apply.

PROGRAM COST - BUDGET USE ONLY

<i>Fund Description</i>	<i>18-19 FTE</i>	<i>Salaries & Benefits</i>	<i>Supplies</i>	<i>Contract Services</i>	<i>Travel</i>	<i>Capital Outlay</i>	<i>Total</i>
Total							