49ERS STEM LEADERSHIP INSTITUTE
Inspiring Future Leaders in STEM
The 49ers STEM Leadership Institute, created in partnership with the San Francisco 49ers, the Silicon Valley Education Foundation, and the Santa Clara Unified School District, is a six-year program that prepares students with high academic potential to be outstanding. The institute aims to inspire and prepare its students to pursue STEM (science, technology, engineering, mathematics) majors at top-tier universities and become the future leaders in their fields.

The inaugural year of the 49ers STEM Leadership Institute began in Summer 2014 with a cohort of 60 incoming seventh grade students. Each year, students will advance with their cohort to the next grade level. A new cohort of 60 incoming seventh graders will be selected through a competitive application process each year. By the end of the six-year rollout process, there will be a total of 360 students from grades 7 – 12 involved in the program, located at one middle school and one high school within the district (Cabrillo Middle School and Santa Clara High School).
KEY PROGRAM COMPONENTS

- motivated and passionate and committed students who have a personal interest in STEM
- multi-year, year-round resources, opportunities, and experiences
- two digital fabrication laboratories to support two school sites
- focus on skills and knowledge to support many STEM pathways

- academic rigor in STEM content (ex: coursework, project based learning)
- leadership in STEM fields (ex: volunteer opportunities, mentoring opportunities, real-world based challenges)
- youth development (ex: high expectations, core values)
<table>
<thead>
<tr>
<th>Where is the program?</th>
<th>Cabrillo Middle School and Santa Clara High School, in Santa Clara Unified School District</th>
</tr>
</thead>
<tbody>
<tr>
<td>Who participates?</td>
<td>7th – 12th graders from across SCUSD, starting with a new cohort of sixty 7th grade students each year (all others advance to the next grade level). Parents participate as volunteers to support the program.</td>
</tr>
<tr>
<td>What does the program do?</td>
<td>Deepen and enhance learning through integrated, project-based instruction and enrichment activities (300+ hours of extended learning time each year) with each student cohort.</td>
</tr>
</tbody>
</table>
| When will this take place? | During the school day, students will attend math and science classes with their cohort. Students will also deepen learning weekly before/after school, two Saturdays a month, and three weeks each summer.  
Weekly: Wednesdays, 7:00AM - 10:00AM (SCHS), 1:30 PM – 4:30 PM (CMS)  
Bi-weekly: Saturdays, 8:00 AM – 12:30 PM  
During the summer: 8:00 AM – 2:30 PM, 5 days/week for ~3 weeks (Last Year’s Dates: July 22, 2019 – August 7, 2019) |
WHERE IS THE PROGRAM?
PROGRAM LOCATION

• Grades 7-8
  Cabrillo Middle School
  2550 Cabrillo Avenue
  Santa Clara, CA 95051
  (Chevron STEMZONE)

• Grades 9-12
  Santa Clara High School
  3000 Benton Street
  Santa Clara, CA 95051
  (Fab Lab Santa Clara High School)
[WHO PARTICIPATES?]
ENROLLMENT CRITERIA
Criteria for admission includes:

• Current enrollment in 6th grade and residence within the geographical area of SCUSD
• Strong academic record (including but not limited to: overall GPA of 3.0 or higher, strong math and science achievement in 6th grade, readiness for Algebra in 7th grade)
• Application essays
• Teacher recommendations
• Student interview
• Student commitment to six-year program
• Parent/guardian commitment to support program

Note: Selected students not currently enrolled at Cabrillo will need to transfer through the SCUSD intra-district transfer process.
PARENT/FAMILY INVOLVEMENT

Families commit to support their students and the 49ers STEM Leadership Institute. Possible avenues include:

• Providing support for competitions as a mentor or coach
• Serving as chaperone for events and trips
• Offering unique program-related experience
• Donating supplies and materials
• Volunteering in classrooms and lab
• Coordinating trips/connections to the STEM industry

Note: We can provide targeted support to families of EL and Special Needs students on a case-by-case basis, as well as other students who may need individualized support.
PROGRAM TEAM

- SLI Director – Janet Wu
- SLI Program Managers – Nimisha Khanduja (CMS), Laurie Toyama (SCHS)
- SLI Program Assistant - Lauren Hayes
- Site Administrators – Stan Garber (CMS), Greg Shelby (SCHS)
- SLI Math Teachers – Wilson Tsang (7th), Glenn Lillie (8th), Marlene Spector (9th), Tracy McClennan (10th)
- SLI Science Teachers – Sarah Rahman (7th), Michelle Scilingo (8th), Suzanne Miller-Moody (9th), Alan Tan (10th)
- SLI 11th/12th Grade Teachers - Jyothi Sunkara (AP Seminar), Kate Flowers-Rossner (AP Research)
- SVEF Leadership - Lisa Andrew (CEO), Rosemary Kamei (VP)
- 49ers Foundation Director - Justin Prettyman
- 49ers EDU, Managing Partner - Jesse Lovejoy
- SCUSD District Leaders - Assistant Superintendents, C&I Directors, TOSAs
- Additional - various support staff, counselors and instructors
[WHAT DO THEY DO?]
WHAT MAKES A STEM LEADER?

- Academic Excellence
- Risk Taking
- Curiosity
- Passion
- Creativity
- Leadership
- Initiative
- Communication
- Determination
- Collaborative Spirit
STANDARDS FOR ACADEMIC EXCELLENCE: MATH AND SCIENCE

Algebra 1 Standards
Math Practices
• Making sense of problems and persevere in solving them
• Reason abstractly and quantitatively
• Model with Mathematics
• Use appropriate tools strategically
• Attend to precision
• Look for and make use of structure
• Look for and express regularity in repeated reasoning

7th Grade Integrated Learning Objectives
• Matter and its Interactions
• Structures and Processes
• Ecosystems
• Earth’s Systems
• Earth and Human Activity
• Engineering Design
COURSE PATHWAYS - SLI Requirement

- 7th grade: Algebra 1 / 7th Grade Integrated Science
- 8th grade: Geometry Honors/ 8th Grade Integrated Science
- 9th grade: Algebra 2 Honors / Biology
- 10th grade: Trigonometry Honors / Chemistry Honors
- 11th grade: AP Seminar
- 12th grade: AP Research

Student choice between rigorous** math and science options offered at SCHS

**Upperclassmen courses offered for math and science: AP Calculus AB or BC, AP Statistics, AP Biology, AP Chemistry, AP Physics, Physiology, Psychology, Biotechnology, etc
[INSPIRE]
SHOW THEM WHAT STEM CAN DO
Students will:
Solve problems by *creatively* leveraging available resources. Complete self-directed projects by taking the *initiative* to master use of standard industry tools.
FIELD EXPERIENCES EXPOSE STUDENTS TO A RANGE OF STEM INDUSTRIES AND DISCIPLINES

Students will:
- Develop **curiosity** in different STEM professions and their function in industry.
- Recognize the multidisciplinary nature of STEM organizations.
[ENGAGE]

PUT PROBLEM SOLVING IN STUDENT HANDS
DESIGN THINKING IS A KEY INSTRUCTIONAL APPROACH THAT IS INTEGRATED INTO ALL AREAS OF THE PROGRAM

Students will:

*Take risks* as they develop and prototype solutions to problems and needs.

*Exhibit determination* through failures in an iterative design process.

*Collaborate* in interdisciplinary teams.
Students will:
Identify **passion** in STEM to drive individual learning trajectory.
Apply STEM concepts in project-based challenges and competitions.
Demonstrate strong **communication** skills through teamwork and presentations.

STEM CHALLENGES/COMPETITIONS PROVIDE SCAFFOLDING FOR PROBLEM SOLVING AND COLLABORATION
<table>
<thead>
<tr>
<th>Competition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>First LEGO League (choice)</td>
<td>Students program an autonomous robot (using the LEGO® MINDSTORMS® robot set) to score points on a thematic playing surface and create an innovative solution to a problem as part of their project, all while being guided by the FLL Core Values.</td>
</tr>
<tr>
<td>Exploravision (choice)</td>
<td>Students are asked to complete a research paper and functioning website on a passion project that examines a STEM-related issue they see in the world around them. They are asked to examine the history and current status of that “technology” as well as propose how the future of that field will look different in twenty years.</td>
</tr>
<tr>
<td>Tech Museum Tech Challenge (choice)</td>
<td>Students are introduced to the science and engineering design process with a hands-on project geared to solving a real-world problem.</td>
</tr>
<tr>
<td>Maker Track (choice)</td>
<td>Students will become confident and capable individuals through the process of making. This activity embraces an entrepreneurship, creativity, design thinking, and peer-to-peer teaching and learning - emphasizing the importance of both hard and soft skills.</td>
</tr>
</tbody>
</table>
## COMPETITIONS

<table>
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<tr>
<th>Competition</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Fair (required)</td>
<td>Students work independently or in teams to address questions in the fields of Computer Science, Environmental Science, Medicine &amp; Health, Chemistry, Biology, and a half dozen other categories through project-based research.</td>
</tr>
<tr>
<td>Math Olympiad (required)</td>
<td>Students participate in five monthly one hour contests, with the objective of encouraging them to intensify their study of mathematics.</td>
</tr>
<tr>
<td>AMC 8 (required)</td>
<td>Students take part in America’s longest-running math competition in both the 7th and 8th grades. Older cohorts also participate in AMC 10 or AMC 12, as these exams are nationally recognized.</td>
</tr>
<tr>
<td>Others (optional in future)</td>
<td>Students will have the ability to participate in and coordinate themselves for challenges/competitions that they are interested in, for example: MathCounts, local hackathons, continuation of mandatory challenges, etc.</td>
</tr>
</tbody>
</table>

**Junior/Senior level - freedom of choice/flexibility**
[MAINTAIN]
CONNECT WITH STEM INDUSTRY
STUDENTS GET EXPOSURE TO LOCAL STEM PROFESSIONALS (GUEST SPEAKERS)

Students will:
Learn about different STEM topics and career paths from connections made through our staff, 49ers Foundation, Silicon Valley Education Foundation, and Chevron.
Students will:
- Gain exposure to different STEM fields and discover areas they are passionate about.
- Innovate and create in research (AP Research).

STUDENTS WILL ATTEND A VARIETY OF FIELD TRIPS AND OPTIONAL ENRICHMENT EVENTS.
A COHORT-BASED MODEL BUILDS A COMMUNITY OF SUPPORT FOR BUDDING STEM LEADERS

Students will:

Hone leadership skills while creating a healthy and active community of learners. Build relationships with cohort of students of varying backgrounds and experiences. Support each other through the academic rigor of the 49ers STEM Leadership Institute.

 Inspire  Engage  Maintain
[WHEN DO THEY MEET?]
## INTEGRATED SCIENCE AND MATH LESSONS DURING SCHOOL HOURS

<table>
<thead>
<tr>
<th>Period</th>
<th>Class</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period 1</td>
<td>English, Social Science, PE, Elective (with Gen Ed student body)</td>
</tr>
<tr>
<td>Period 2</td>
<td>Science 7/Algebra I (with SLI 7th graders only)</td>
</tr>
<tr>
<td>Period 3</td>
<td>Science 7/Algebra I (with SLI 7th graders only)</td>
</tr>
<tr>
<td>Period 4</td>
<td>Science 7/Algebra I (with SLI 7th graders only)</td>
</tr>
<tr>
<td>Lunch</td>
<td>Science 7/Algebra I (with SLI 7th graders only)</td>
</tr>
</tbody>
</table>
Students will:
Extend classroom learning to address real-life challenge while using design thinking principles
Engage in a collaborative consensus building process
### SATURDAY SESSION: SAMPLE SCHEDULE

<table>
<thead>
<tr>
<th>TIME</th>
<th>8th grade MF teams</th>
<th>8th grade TC teams</th>
<th>7th grade MF teams</th>
<th>7th grade TC teams</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:30-8:45</td>
<td></td>
<td></td>
<td>Announcements/Check-In</td>
<td></td>
</tr>
<tr>
<td>8:50-9:50</td>
<td>Fusion 360: Cell Phone Case Design</td>
<td>Work on Tech Challenge Projects</td>
<td>Prepare for Spring Symposium</td>
<td>Prepare for Spring Symposium</td>
</tr>
<tr>
<td>9:50-10:10</td>
<td>Advisory Session</td>
<td>Advisory Session</td>
<td>Work on Maker Faire Projects</td>
<td>Work on Tech Challenge Projects</td>
</tr>
<tr>
<td>10:10-11:10</td>
<td></td>
<td></td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>11:15-12:15</td>
<td>Work on Maker Faire Projects</td>
<td>Fusion 360: Cell Phone Case Design</td>
<td>Advisory Session</td>
<td>Advisory Session</td>
</tr>
<tr>
<td>12:20-12:30</td>
<td></td>
<td></td>
<td>Clean Up/Check-Out</td>
<td></td>
</tr>
</tbody>
</table>

**Students will:**
Define incremental goals in a longer design process
Refine product in collaboration with industry experts and peers
Creatively leverage learning center resources to prototype projects
## SUMMER SESSION: SAMPLE SCHEDULE

<table>
<thead>
<tr>
<th>TIME</th>
<th>Group 1</th>
<th>Group 2</th>
<th>Group 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>8:00-8:10</td>
<td></td>
<td>Announcements</td>
<td></td>
</tr>
<tr>
<td>8:10-8:35</td>
<td></td>
<td>Advisory Groups</td>
<td></td>
</tr>
<tr>
<td>8:35-9:45</td>
<td>Design Thinking: Locker Design Challenge</td>
<td>Computational Thinking</td>
<td>CAD software and laser cutting</td>
</tr>
<tr>
<td>9:45-10:55</td>
<td>CAD software and laser cutting</td>
<td>Design Thinking: Locker Design Challenge</td>
<td>Computational Thinking</td>
</tr>
<tr>
<td>10:55-11:05</td>
<td></td>
<td>Break</td>
<td></td>
</tr>
<tr>
<td>11:05-12:15</td>
<td>Computational Thinking</td>
<td>CAD software and laser cutting</td>
<td>Design Thinking: Locker Design Challenge</td>
</tr>
<tr>
<td>12:15-12:45</td>
<td></td>
<td>Lunch</td>
<td></td>
</tr>
<tr>
<td>12:45-2:30</td>
<td></td>
<td>Field Trip to local industry</td>
<td></td>
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</tbody>
</table>

**Students will:**
Understand the work of engineers
Learn about the breadth of STEM career opportunities in any given company
Work in interdisciplinary teams to apply integrated STEM in a product design process
[IMPORTANT DATES]

• 10/10/19: Application Opens
• 11/14/19: Family Informational Meeting
• 12/5/19: Application Closes
• 1/17/20: Semi-finalists invited to interview
• 1/23-1/24, 1/27-1/29/20: Semi-finalist Interviews
• 2/7/20: Accepted students notified
• 2/10/20: Mandatory commitment meeting for accepted students
• 2/28/20: Accepted students commit to program

Questions? Check out our webpage for FAQs at www.49ersSLI.com
Email: SLIadmissions@svefoundation.org
[Q&A]