

Report Prepared for

Report by:  
Natalie R. Nielsen, Ph.D.  
N<sup>2</sup> Consulting  
November 2016

# Salinas Valley K-12 STEM Learning Ecosystem

---



## EXECUTIVE SUMMARY

This report responds to a request from the Hartnell College President's STEM Task Force to define the landscape of science, technology, engineering, and mathematics (STEM) learning opportunities for K-12 students in the Salinas Valley. Using data from interviews of 50 local K-12 and community based STEM education providers, the report:

- Describes STEM in the K-12 education system for nine of Hartnell College's larger feeder districts.
- Identifies and categorizes community based STEM learning opportunities.
- Discusses the creation of an ecosystem of K-12 STEM education providers and stakeholders to bring together community resources in ways that strengthen local K-12 STEM preparation.
- Offers a focused set of recommendations to catalyze the formation of the ecosystem and help the STEM Task Force achieve its aims.

Now is an opportune time to foster a K-12 STEM learning ecosystem in the Salinas Valley. Local K-12 and postsecondary educators and informal STEM education providers appreciate the importance and ubiquity of STEM in society. These stakeholders also share a desire to provide young people from the Salinas Valley with opportunities for socio-economic advancement. Many view STEM as a potential vehicle for providing those opportunities, and see a need to stimulate awareness of and interest in the full range of STEM-related majors and careers.

In addition, K-12 STEM education in Monterey County stands on the cusp of major change. With some exceptions, current science learning opportunities in the local K-12 curriculum reflect a national de-emphasis of science education over the past 15 years—particularly at the elementary level. However, California has recently adopted new K-12 academic standards for science learning (Next Generation Science Standards [NGSS]), and has recently begun implementing new academic standards for mathematics learning (Common Core State Standards in Mathematics). These standards call for profound shifts in the way science and mathematics are taught, and some local districts have already begun a significant transformation of STEM education in response. Other districts seem poised for such a transformation.

As they contemplate the future of K-12 STEM education, local districts are seeking to make STEM relevant to students' lives and career opportunities. They also are eager to increase their capacity to implement the new math and science standards. External partnerships and professional learning networks such as a K-12 STEM learning ecosystem could help them meet these goals.

The Salinas Valley also is h







five sites. It serves more than 300 students throughout the Salinas Valley each year.

- Introduction to Coding, an outgrowth of Coder Dojo that is designed for students in grades K-6 who have no prior coding experience. The program is primarily offered at schools on Saturdays and during the summer

4. What can various stakeholders do to increase the number of students in the Salinas Valley who are interested in and prepared for STEM-related majors and careers?

To address these questions, N<sup>2</sup> Consulting conducted in-depth interviews with school district officials; Monterey County Office of Education (MCOE) representatives; and STEM-related program providers at Hartnell College, California State University Monterey Bay (CSUMB), Monterey Peninsula College (MPC), and local community-based organizations. The interviews were supplemented with reviews of school and district websites and Local Control Accountability Plans to identify STEM priorities and activities.

In all, these interviews included 50 people within 34 institutions or organizations. Table 1 summarizes the organizations and programs that participated in interviews or otherwise provided information to support the data-gathering efforts.

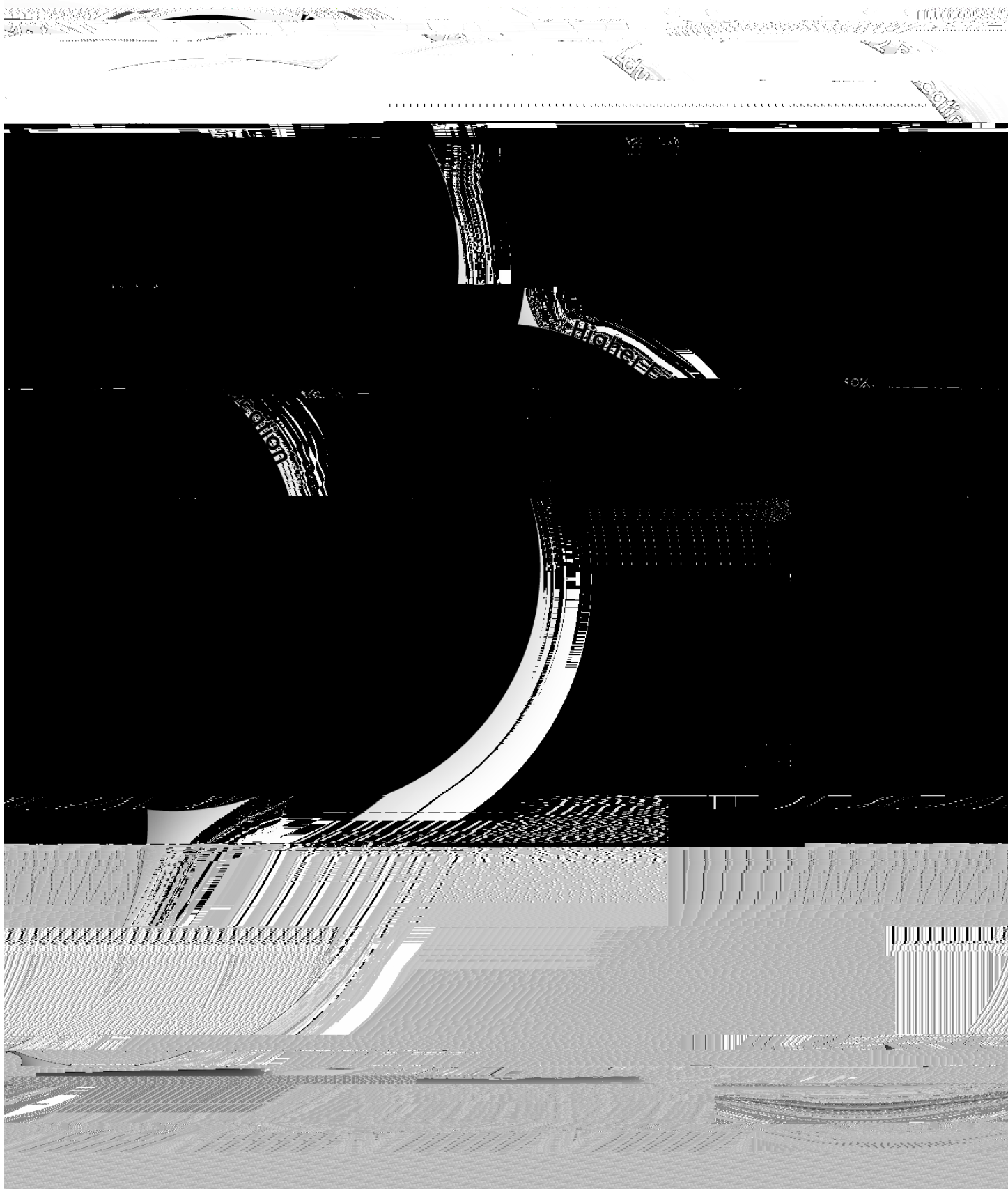
Monterey County has 24 school districts, 20 of which are feeder districts for Hartnell because of their location.<sup>5</sup> Nine of these 20 districts have fewer than 1,000 students and 5 of those have fewer than 100 students. This examination focused on the larger feeder districts from King City north. It included interviews with representatives from 9 of the 11 feeder districts with roughly 1,000 or more students, as well as Pajaro Valley Unified School District in Santa Cruz County.<sup>67</sup> The community based organizations in Table 1 are either entirely focused on one or more STEM disciplines, or have significant STEM programming.

---

<sup>5</sup> See district maps at <http://www.montereycoe.org/districts-schools/district->









Indeed, “Common Core First, then NGSS” was a common refrain among the district officials interviewed,

To date, NGSS implementation activities in Monterey County school districts range from awareness-building for teachers (Alisal Union, King City, North Monterey County Unified, South Monterey County Joint Union High) to professional development on the content of NGSS (Greenfield, Salinas City, Salinas Union) to course and curriculum redesign (Pajaro Valley, Gonzales). Most of the districts interviewed for this study see NGSS as an opportunity to integrate disciplines through project-based learning, thereby making science—and education more broadly—more relevant













Like after-school programming in elementary school, however, these kinds of clubs mostly depend on the interest and capacity of teachers who are willing to take on extra



add STEM career awareness to this program in 2016-17 for families of students in upper elementary and middle schools.

- *Hartnell's Family Café*. This component of the NASA MUREP program engages parents in STEM education activities.

### Teacher Professional Learning and Capacity

Over the past few years, districts have placed considerable emphasis on bolstering their mathematics capacity in the wake of Common Core. These efforts are ongoing, and in some cases still represent a predominant focus of districts' professional development efforts.

At

## District Partnerships to Advance K-12 STEM Education

Many districts have long-





Table 3. Year-Round, Non-School Based Programs Offering STEM

Program	Synopsis of Mission/Focus	Program Location	Salinas Valley Students Served Per Year
Girl Scouts	Youth development, optional STEM badges	North Monterey Co., East Salinas, Downtown Salinas	322 in all locations



*The Monterey County 4-H program* serves more than 700 young people aged 5-19 from Aromas to King City. The program consists of 14 community 4-H clubs led by adult volunteers. Young people participate in experiential education programs based in agricultural science (e.g., poultry, dairy, textiles, agronomy)



- Teen Conservation Leaders Program. This two-week program trains approximately 120 students per year to be volunteers in the Aquarium. With far more applicants than availability, the Aquarium selects students from throughout the region and does not target a specific school or area. In 2016, 22 students were from Salinas, 2 were from Gonzales, and 2 were from Soledad. Transportation is provided for students from Salinas, but distance makes it difficult for students from South County to participate.

*The Lyceum of Monterey County's Cyber Adventurers Program* is designed to increase girls' interest in STEM, and particularly in computer science. The weeklong summer program operates out of La Paz Middle School









## RECOMMENDATIONS TO SUPPORT A K-12 STEM ECOSYSTEM

This report has highlighted the strong efforts of local K-12, postsecondary, and informal educators to prepare students in the STEM fields. The collective impact of these efforts could be enhanced by a K-12 STEM learning ecosystem with the elements of STEM career awareness, support for Common Core Mathematics and NGSS imp

