

Update on the Implementation of the *California Next Generation Science Standards*

State Board of Education Meeting
November 8, 2018

CALIFORNIA DEPARTMENT OF EDUCATION
Tom Torlakson, State Superintendent of Public Instruction



Previous Board Action

- The State Board of Education (SBE) adopted the *California Next Generation Science Standards (CA NGSS)* in September 2013.
- The SBE adopted the middle school Integrated Learning Progression Model in November 2013.
- The *CA NGSS Systems Implementation Plan* was adopted by the SBE in November 2014.



Key State-Level Activities

| Date | Key Event |
|-------------------|--|
| September 2013 | SBE adopts the <i>CA NGSS</i> |
| November 2014 | SBE adopts the Implementation Plan |
| November 2016 | SBE adopts the 2016 Science Framework for California Public Schools |
| January–July 2017 | Pilot assessment of California Science Test (CAST) and California Alternate Assessment (CAA) for science |
| January–July 2018 | CAST field test, second-year pilot of the CAA for science |
| November 2018 | SBE takes action on instructional materials |
| January–July 2019 | CAST operational test and CAA field test for science |



CA NGSS Systems Implementation Plan: Strategy Eight

Build coalitions to ensure a consistent message and to sustain momentum during CA NGSS implementation.



Supports for Local Implementation

- 2014–18 CA NGSS K–8 Early Implementation Initiative
- Statewide Science Collaboration Committee and Communities of Practice
- The CA NGSS Collaborative



Presenters

- **Jill Grace:** President, California Science Teachers Association and Regional Director, K–12 Alliance at WestEd
- **Susheela Nath:** Science Grant Project Director, Aspire Public Schools and Project Director, CA NGSS K–8 Early Implementation Initiative
- **Debra Schneider:** Director of Instructional Media Services and Curriculum, Tracy Unified School District (USD) and Project Director, CA NGSS K–8 Early Implementation Initiative
- **Marian Murphy-Shaw:** Educational Services Director, Siskiyou County Office of Education
- **Ramona Chang:** Director of Curriculum and Instruction, Torrance USD



Transitioning to the CA NGSS

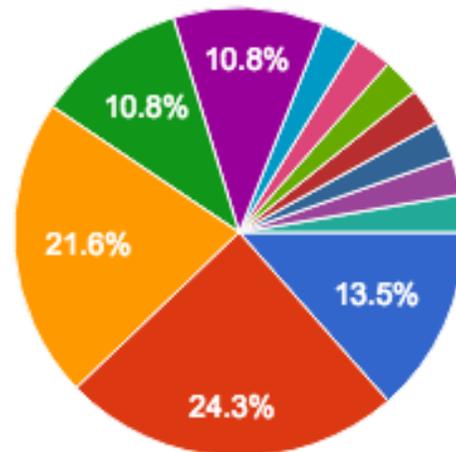
Input from 37 District TOSAs/Coaches, October 2018

How many years has your district been implementing the NGSS?

5 years - 13.5%; 4 years - 24.3%; 3 years - 21.6%; 2 years - 10.8%; 1 year - 10.8%; This is our first year - 2.71%; Soft rollout, secondary is implemented - 2.71%; There has been no technical implementation - 2.71%; Still in transition - 2.71%.

How many years has your district been implementing the NGSS?

37 responses



Pulse of CA NGSS Implementation

| Successes | Challenges | #1 Lesson Learned |
|--|---|---|
| Investment in teacher leaders to help others --- More science professional learning (PL) | More time to help teachers make pedagogical shifts --- Lack of funds for PL, materials --- ELA/Math prioritized | Have a comprehensive PLAN for ongoing sustained support |



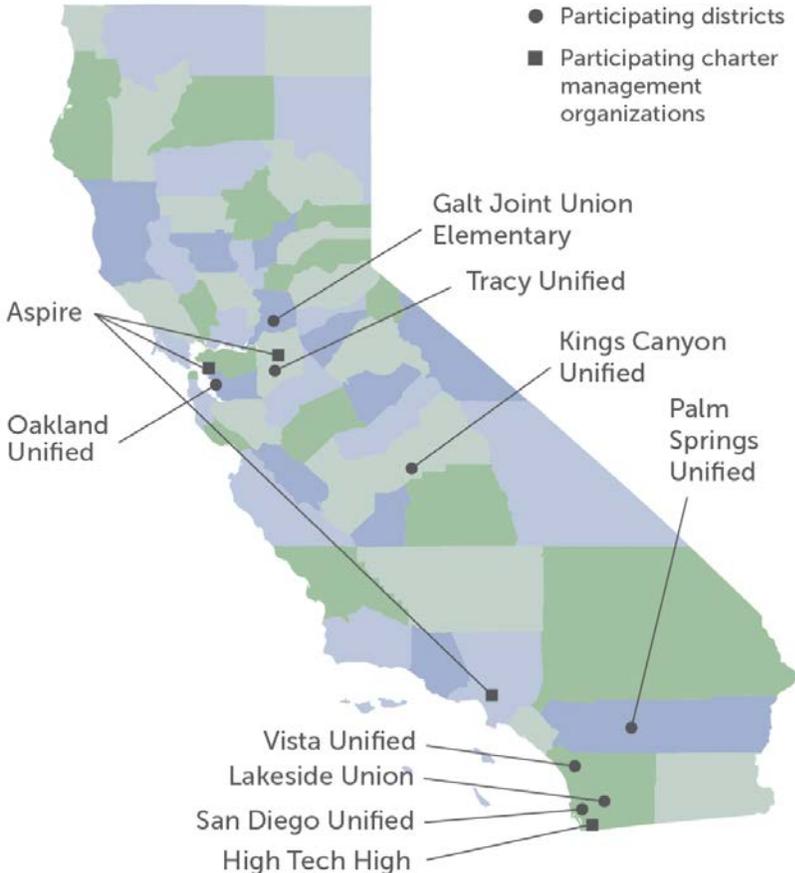
CA NGSS K-8 Early Implementation Initiative

Early Implementation Districts:

- Galt Joint Union Elementary
- Tracy Unified
- Kings Canyon Unified
- Palm Springs Unified
- Oakland Unified
- Vista Unified
- Lakeside Union
- San Diego Unified

Early Implementation Charters:

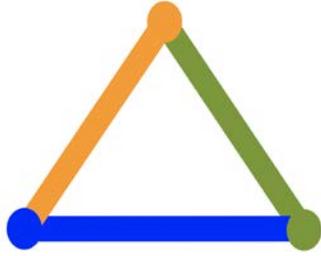
- Aspire
- High Tech High



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STEPHEN BECHTEL FUND

Hastings Quillin Fund





Theory of Change

1. Change LEA Policies and Practices for Science Education
2. Build Administrator Leadership
3. Build Teacher Leadership
4. Change Teacher Practice
5. Increase Opportunities for Student Learning
6. Build Community of Learners to Share Best Practices Within the State and Nationally



The Results are Promising (1)

Kids like learning science

NGSS helps students learn *all* subjects

NGSS helps teachers improve *all* instruction

Instruction with NGSS is doable - regardless of experience

Success requires professional learning for teachers and admin

Reports available at k12alliance.org

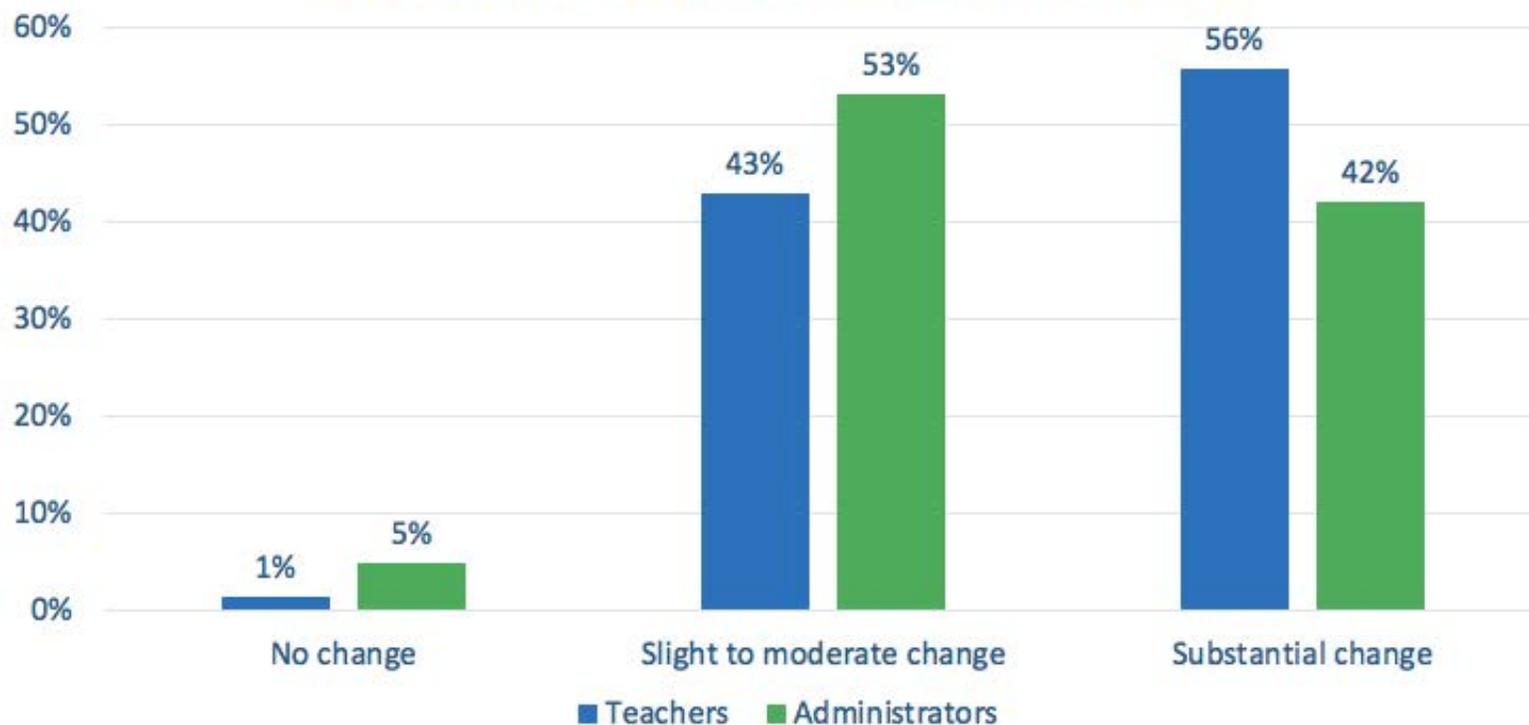


The Results are Promising (2)

This is a chart from a forthcoming report from the CA NGSS K-8 Early Implementation Initiative on student engagement showing the percentage of teachers and administrators reporting positive changes in general quality of science learning in NGSS classroom: 1% of teachers and 5% of administrators report no change, 43% of teachers and 53% of administrators report a slight to moderate change, and 56% of teachers and 42% of administrators report a substantial change.

*Data taken from the 2017-2018 Classroom Science Teaching Survey (N = 293) and from the 2017-18 Survey for Principals (N = 65).

Percentage of teachers and administrators reporting positive changes in general quality of science learning in NGSS classrooms



*Data taken from the 2017-2018 Classroom Science Teaching Survey (N = 293) and from the 2017-2018 Survey for Principals (N = 65).



The Results are Promising (3)

“It was a totally different science class than I’d ever seen. The kids were talking about particle size, particle structure, friction. It was like little soil scientists in there talking about why a mudslide happens, and I went, “Wow this is really something!” Just the way they talked to each other and the way they listened to each other and the way they questioned each other. It was like a college class.”

- Middle school principal



Aspire Public Schools (1)



Aspire Public Schools (2)

Education transforms futures.



BAY AREA

Richmond, Oakland,
East Palo Alto



CENTRAL VALLEY

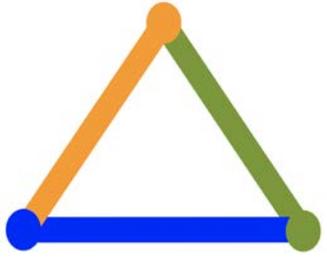
Stockton,
Sacramento, Ceres,
Empire, Modesto



LOS ANGELES

Huntington Park,
Los Angeles,
South Gate





Changing Teacher Practice

More of...

- Student-Student discourse
- Cohesive storyline
- Teachers using what they are learning in science to all content areas
- About the practice of Science

Less than...

- Teacher talk
- Individual learning
- Rather than being in silos
- The reading and regurgitating facts



Teacher Quotes (1)

"It's not spoon-feeding answers the way it used to be. Science used to be a finite amount of information, and old school teachers were the ones who disseminated all knowledge. Now I'm not the keeper of information anymore. I'm the guide for how you process information, I'm the one who poses the question about what you can think about and the students become the drivers of their learning."



Teacher Quotes (2)

“The Early Implementer NGSS initiative has helped me implement high quality instruction that is driven by Phenomena and integrates common core standards. My students have never been so eager to learn science, ask questions, and discuss core ideas. The SEPs, DCI's and CCCs are preparing students for STEM careers, college, and the 21st Century.”

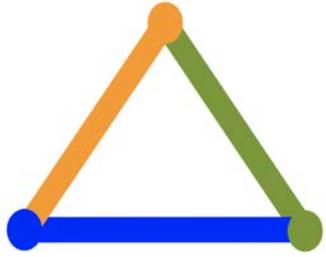


Student Quotes

“My favorite part of science is the investigation, I learn best when I do science and try and figure out things. This new way of science allows for us to understand the science and how it applies to real world problems.”

“This is the first time I have had a love for science. Our teacher opens up the classroom for us to investigate like Scientists and problem solve like Engineers. We are not reading out of textbooks and just filling out packets, WE are actually doing Science!”





Changing Student Outcomes

- Increasing opportunities for students to learn
- Minutes for Science have increased
- Family opportunities to engage in Science through Family Science and Engineering nights
- Dinner with the Scientist
- Students are getting bigger ideas and are writing about them



Partnerships

Biggest learning: everyone needs thought partners and that we can not do this by ourselves

WE wanted to strengthen environmental literacy and engineering, one of our learnings was we needed partnerships.

We have been able to form partnerships to Institutions of Higer Education and informals (NASA JPL and 5 Gyres)



Keep the Main Thing the Main Thing

Implementation is never smooth

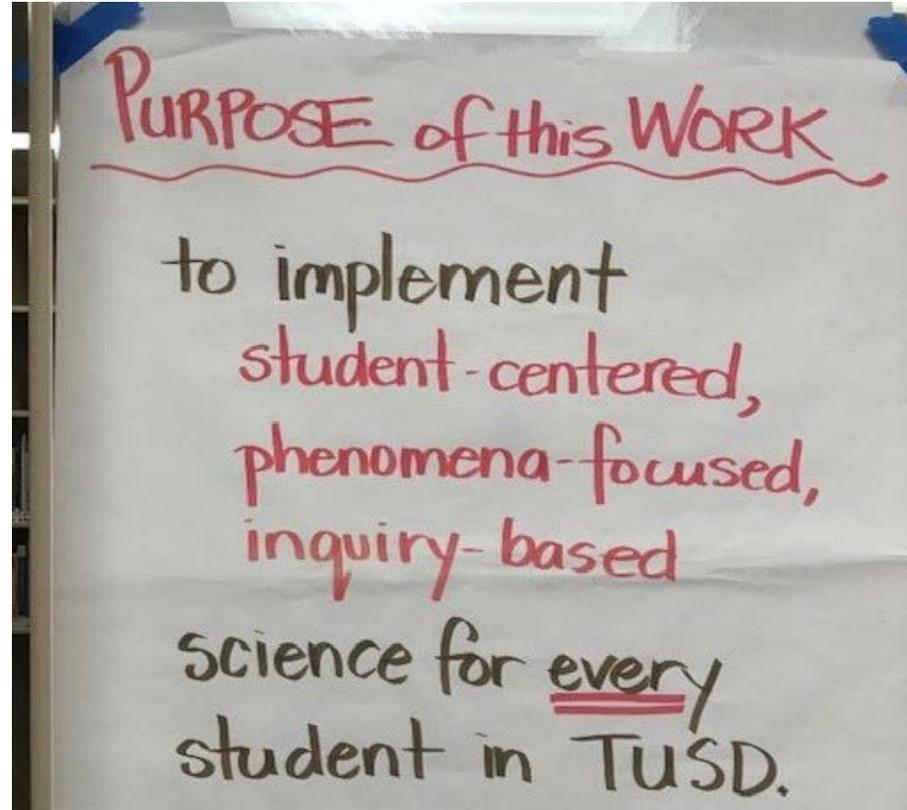
Embrace the challenges

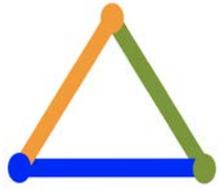
Keeping the focus on the kids is the key to success



Student Outcomes Drive Efforts

Vision Matters



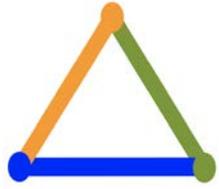


Build Community, Share Practices

Professional Learning Partnerships

- K-12 Alliance (PreK-8)
 - Lesson study impact on teaching, learning
- San Joaquin COE support (6-8, 9-12)
 - Extra support for middle school transition
 - Support to expand efforts to high school



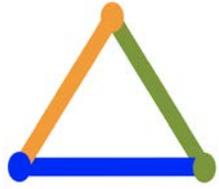


Build Administrator Leadership

Provide Multiple Points of Entry

- Consider differentiation by
 - Administrator's knowledge, needs
 - Site's needs, culture
 - Size of group



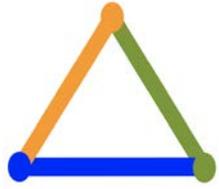


Build Teacher Leadership

Scale Up

- Push to site-based leadership
 - increases legitimacy
- Provide support at district level
 - provide quality control





Persist...It Takes Time

Take One Step...Then Another...

- Start and never stop
- Tracy USD received 2018 Federal EIR grant for a **PreK-12 STEM Pathway** for *all* Tracy USD students
 - \$4 million over 5 years (EIR early phase grant)
 - Based partly on the strong foundation in place
 - Required a strong, evident focus on equity



Rural Community of Practice (1)

CCSESA Region 2

Nine counties with 5,000 teachers, serving 90,000 students

- Significant portion in multi-grade or multi-subject classrooms
- Many at sites often hours from County Offices or Universities
- Limited access to substitutes to allow professional learning

Thanks to the *CA NGSS Rollouts* Region 2 had a core of science leaders ready and willing to work with the vision of the Communities of Practice – **Shared learning for the leaders who support teachers.**



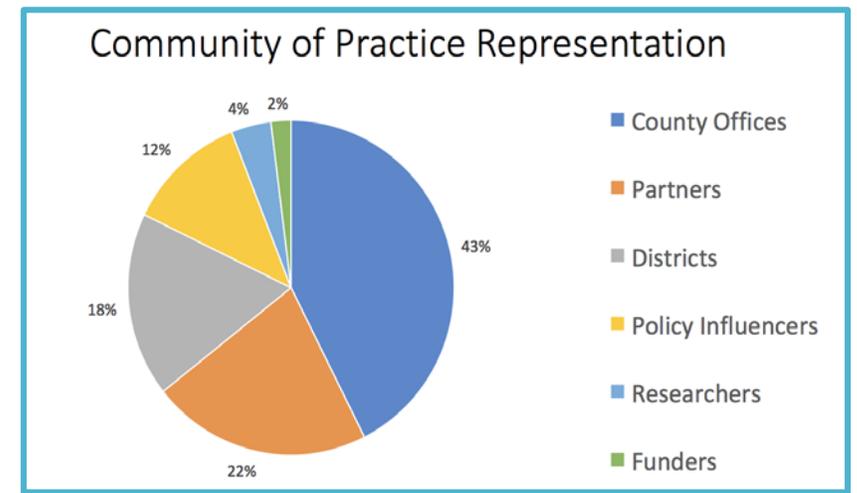
Rural Community of Practice (2)

Both the Collaboration Committee and Community of Practice (CoP) have, and continue to, inform our work.

Region 2 CoP is a project with both mathematics and science, focusing on **student and teacher equity and access** to learning through discourse.

We are a Collaboration Committee of 30 teacher, county, university, and partner members who learned and planned together, using video meetings.

A local leadership team from 4 counties oversees the project operation.



Inspired by Colleagues

The Region 2 vision to make professional learning accessible to the many small and remote communities began with some imagination and “what ifs.”
The Exploratorium demonstrated the possibilities for us.

If we had...

- High quality audio, video, and camera manipulation
- Site facilitators, coordinated presentations, and online shared materials

...**could we** make video an engaging professional learning delivery?



Learning as a Community

- The live event brought speakers from the University of Washington School of Education, Chico State Math Project, and The Exploratorium to 200 people at eight locations on a single Saturday in September to learn about, and experience, Productive Student Discourse in mathematics and science.
- Participants called it “*meaningful, engaging, and helpful to their deeper understanding about evidence of student thinking.*”
- We learned more about what we can do with video as a professional learning tool, and continue to support educators through local work that is unique in each county.



Torrance Unified School District

- Student-driven demand for inquiry-based learning.
- Beginning in 2005, elementary teachers were immersed in experiential lessons through a week long professional academy.
- A cohort of teachers met on a regular basis, supporting each other to sustain the concept of inquiry-based learning.
- Each year as more teachers participated in the professional academy and other professional events we were able to build **district-wide instructional change**.



Pedagogical and Curriculum Shifts

- In 2012, when the national document *A Framework for K-12 Science Education* was released, we began to prepare for both the **pedagogical shift and the curriculum shift**.
- In 2013, our Professional Development days, our Professional Learning Community time, and sub-release time all focused on science.
- We asked the tough questions...of our middle school teachers: Should we keep a traditional subject-specific structure or adopt an integrated structure?



NGSS Implementation (1)

- By 2015, we had a Board approved middle school integrated model for science instruction.
- Hired Teachers on Special Assignment—our best science teachers—to work with our site leads, modeling lessons and observing classroom teachers at both the elementary and middle school level.
- Our official rollout began in 2015 with a focus of upper-elementary teachers and middle school teachers.
- Expanded out to primary teachers and high school teachers.



NGSS Implementation (2)

- In 2016, our high school science teachers began the work to integrate and align the *Earth and Space Science Standards* into Biology, Chemistry, and Physics to optimize student engagement and inquiry.
- We work with our local college and university partners, colleagues at NSTA, CSTA and others to expand our repertoire.
- By 2017, the time California was ramping up CA NGSS implementation with CAST administration, our **teachers, community, families, and students were all comfortably embracing the shift.**

