



Mountain View  
Whisman  
School District

# Science Advisory Committee Recommendation

March 2019





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School District

# Why a Science Advisory Committee

# Alignment

**Strategic Plan Goal 1: Every Student will be prepared for high school and 21st century citizenship**

- **Desired Outcome:** Student demonstration of MVWSD Profile of a Graduate Skills
- **Action:** Implement Capstone type projects at the conclusion of 5th and 8th grade
- **Desired Outcome:** Elementary Science Curriculum that supports inquiry
- **Action:** Adopt Next Generation Science Standards

**Board Of Trustees Goal 2:** Develop a plan of action to increase the science and technology offerings at all schools



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# Process and Progress

# Progress and Process - Elementary

- Response to Instruction is science based at Bubb, Huff, and Stevenson and lessons are CA NGSS aligned
- RTI teachers from Bubb have worked collaboratively with the middle school science coach
- Teachers at Castro have participated in NGSS training through the County Office of Education and through Science is Elementary
- Teachers at Theuerkauf, Stevenson and Monta Loma have begun professional development in CA NGSS

# Process and Progress - Middle School

- The middle school science department began their work with NGSS in 2015
- After attending the first NGSS symposium and participating in a full day of training with the science coordinator from Santa Clara County Office of Education, the science department made the choice to focus on an integrated model
- This model required a great deal of collaboration, training, and adjustment of programming at each grade level

# Process and Progress - Middle School

- Middle School Science department attended NGSS Symposiums #1-4
  - 2/15, 11/15, 1/16, 12/17
- Training with Science coordinator from Santa Clara County Office of Education - 8/15
- Release days used for teachers to develop CA NGSS lessons with the science coach
- Summer planning in June 2017 focused on grade level scope and sequence
- Summer planning 2018 will focus on NGSS assessments

# Process and Progress - Middle School

The middle school science team collaboratively designed NGSS lessons and a grade level scope and sequence that focused on

- Instructional units
- Performance Expectations
- Science and Engineering Practices
- Disciplinary Core Ideas
- Cross Cutting Concepts



# Process and Progress - Middle School

The science coaches from the District, Mountain View Los Altos Union High School District, and Los Altos School District began collaborating in 2016-17 to support vertical articulation with the high school on the following topics:

- Science and Engineering Practice (SEP) 6  
Constructing Explanations
- Science and Engineering Practice (SEP) 7  
Engaging in Arguments from Evidence
- Assessments

# Process and Progress - Input

Representatives from Discovery Education came and led groups through process to gain information on a vision for science education

- Questions:
  - Where are we now?
  - Where do we want to go?
  - What victories in Science have you experienced?
  - Next Steps

August 6: Cabinet

September 4: Leadership Team

# Process and Progress - Input Themes

## Where are we now?

- Past has been about knowing how science works/facts. Now, more inquiry based
- Elementary teachers have many initiatives and responsibilities
- Teachers do not have inquiry background and may not feel confident in instructing.

## Where do we want to go?

- All four aspects of STEM or STEAM implemented
- Integrated, not stand alone
- Students are learning problem solving tools for social impact
- Engaging, interesting, meaningful
- To see students curious
- Build teacher capacity
- Students to have a service component

## What victories in Science have you experienced?

- Teachers at a site want more Professional Development in science
- Middle school teachers are implemented integrated NGSS instruction
- Teachers generally care and want to teach science
- At some sites, all grade levels are getting hands on science

# Process and Progress - Thought Exchange

**Thought Exchange Surveys conducted:  
November/December 2018**

## **Question:**

- What are some important STEM programs or opportunities you would like to see offered to students?  
(please include why you think it is important)

# Process and Progress - Thought Exchange

Group	Participation	Thoughts Contributed	Stars Assigned
<b>Staff</b>	<b>55</b>	<b>43</b>	<b>429</b>
<b>Top Thoughts</b> <ul style="list-style-type: none"> <li>• Make STEM equitable across the District including at elementary schools</li> <li>• Get ready for NGSS</li> <li>• Qualified teachers</li> <li>• Integration with math and other core subjects</li> </ul>			
<b>Parents</b>	<b>91</b>	<b>101</b>	<b>1731</b>
<b>Top Thoughts</b> <ul style="list-style-type: none"> <li>• More hands on learning - less screens</li> <li>• Integration with coursework</li> <li>• Differentiated Math</li> <li>• Coding</li> </ul>			
<b>Students</b>	<b>1086</b>	<b>1252</b>	<b>36,578</b>
<b>Top Thoughts</b> <ul style="list-style-type: none"> <li>• More field trips</li> <li>• More art (STEAM)</li> <li>• Hands on learning</li> <li>• Cooking</li> </ul>			

# Process and Progress - Technology

## TechSmart Grant

- With the generous support of Google.org's \$100,000 Education Grant, Mountain View Educational Foundation will fund Mountain View Whisman School District's full-year pilot of supplemental computer science curriculum through TechSmart
- This model will enable all students to learn and advance in coding & computer science and will include the following five components
  - In-depth coding teacher professional development
  - Multi-year coding curriculum pathway sequence (grades 3-8)
  - Differentiated and rigorous coding courses offered on the master schedule
  - Integration of coding into core subjects
  - Computer Science work-based learning program to connect students and teachers to the world of work via partnerships with local corporate businesses.

# Process and Progress - Technology

## Initial Pilot

- 2 elementary schools (all 3rd through 5th grade teachers) and 2 middle schools (math and elective teachers)
  - Teacher Coding Bootcamp (5 days elementary and 8 days middle school) - provide teachers with a strong computer science competency while increasing their confidence and positive self-perception as a computer science teacher.
    - Instruction in the full breadth and depth of the curriculum their students will experience.
    - Teachers complete over one hundred coding exercises and write over 2,500 lines of code, then learn the necessary pedagogical approach to teach computer
    - Cohorts will become a computer science professional learning community (CSPLC) that supports continued learning, collaboration, and the sharing of best practices.

# Process and Progress - Committee

<b>Name</b>	<b>Site</b>	<b>Position</b>
Swati Dagar	Theuerkauf	Principal
Michael Jones	Vargas Elementary	Principal
Laurel Shepard	Bubb	RTI Science Teacher
Sarah Denton	Theuerkauf	Coach
Karen Gordon	Landels	Coach
Robert Poling	Bubb	RTi Teacher
Angela Bisbee	Stevenson	Teacher
Jessica Goldberg	Landels	Teacher
Ranen Bhattacharya	Crittenden/Graham	Science Coach
Tara Vikjord	District Office	Administrator
Cathy Baur	District Office	Administrator



# Process and Progress- Elementary Option 1

## Traditional Science Program (classroom teacher driven)

- **Rationale:** All elementary teachers should be knowledgeable about and able to provide quality science instruction.
- **Description:** Engaging science instruction using updated materials is delivered at a minimum of 2 days per week by classroom teachers and is integrated across other content areas

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>Training Focus</b>	<b>Teachers/Administrators</b> General structure and organization of NGSS standards including Phenomena, Disciplinary Core Ideas (DCI) and Model lessons	<b>Teachers/Administrators</b> Science and Engineering Practices and -5E Model of Science Instruction (engage, explore, explain, elaborate, evaluate)	<b>Teachers/Administrators</b> Curriculum Training including new resources and pacing guides
<b>Curriculum</b>	Use current FOSS materials with modified pacing and lesson structure to align with NGSS	Convene task force to review, pilot and recommend new materials. Continue to use FOSS materials	Implement new curriculum
<b>Assessment</b>	CALifornia Science Test (CAST) practice tests	Implement a science performance task that includes skills in the 'Profile of a Graduate'	Implement district created assessments
<b>Integration of Profile of a Graduate and Capstone</b>	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring
<b>Coding and Computer Science</b>	Techsmart Pilot 2 elementary schools	Possible expansion to 6 elementary schools based on results of the pilot	Possible Expansion to all elementary schools

# Process and Progress- Elementary Option 1

Pros	Cons
No additional staffing costs	Time/consistency in instruction based on teacher knowledge and comfort with science instruction
Every teacher is trained in NGSS	No new materials until year 3
Incorporates Profile of Graduate, Capstone, NGSS and Coding/Computer Science	Overloading teachers (new social studies, new science curriculum and new computer science curriculum)
	Teacher mindset about science
<b>Fiscal Implication:</b> Least expensive option; costs include professional development, restructuring pacing guides and lesson structure, Curriculum, and TechSmart	

# Process and Progress- Elementary Option 2

## Combination Science Program

### Classroom Teacher and Science Teacher

**Rationale:** All elementary teachers should be knowledgeable about and able to provide quality science instruction.

**Description:** In this option, teachers would be trained in NGSS and be expected to deliver science content. There would be one dedicated science teacher at each site to do labs that correlate to classroom instruction at least one time per week.

	<b>Year 1</b>	<b>Year 2</b>	<b>Year 3</b>
<b>Training Focus</b>	<p><b>Teachers/Administrators</b> General structure and organization of NGSS standards, Phenomena, Disciplinary Core Ideas (DCI) and Model lessons</p> <p><b>Specialized Science Teachers</b> Comprehensive Summer Training</p>	<p><b>Teachers/Administrators</b> Science and Engineering Practices (SEP)</p> <p><b>Specialized Science Teachers</b> Training based on needs identified in 2019-20</p>	<p><b>Specialized Science Teachers</b> Curriculum Training including new resources and pacing guides</p>
<b>Curriculum</b>	Use current FOSS materials with modified pacing and lesson structure to align with NGSS	Convene task force to review, pilot and recommend new materials; Continue to use FOSS materials	Implement new curriculum
<b>Assessment</b>	CALifornia Science Test (CAST) practice tests	Implement a science performance task	Implement district created assessments
<b>Integration of Profile of a Graduate and Capstone</b>	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring
<b>Coding and Computer Science</b>	Techsmart Pilot 2 elementary schools;	Possible expansion to 6 elementary schools based on results of the pilot	Possible Expansion to all elementary schools

# Process and Progress- Elementary Option 2

Pros	Cons
Every teacher is trained in NGSS	One additional teacher would have to be hired at each site to teach science labs and would lessen the load on classroom teachers
Students would have regular lab experiences	It is possible that regular education teachers will rely on the specialist for science instruction
RTI becomes standardized as a literacy /math model	Changes RTI models at science specific sites
You could have teachers divided into K-2 and 3-5; they could do multiple sites	Credentialing & scheduling challenges
Equity of instruction for students with science specialist	Time for teachers and experts to collaborate
Incorporates Profile of Graduate, Capstone, NGSS and Coding/Computer Science	Dedicated Space needed for labs
<b>Fiscal Implication:</b> Most expensive option; Costs include hiring of science teachers in addition to RTI teaches, facilities for labs, professional development, restructuring pacing guides and lesson structure, curriculum, and TechSmart	

# Process and Progress- Elementary Option 3

## Option 3: Response to Instruction Model

**Rationale:** In this option, teachers would be trained in NGSS and be responsible for collaborating with 1-2 other science expert teachers on science instruction. Classroom teachers would be responsible for providing intervention/enrichment.

**Description:** Engaging science instruction using updated materials is delivered at a minimum of 2 days per week by science expert (RTI) teachers. This team would review the models currently in use at Bubb, Huff and Stevenson as well as look for other exemplars.

# Process and Progress- Elementary Option 3

	Year 1	Year 2	Year 3
<b>Training Focus</b>	<p><b>Teachers /Administrators</b>  <b>Day 1</b> - General structure and organization of NGSS standards, Phenomena, Disciplinary Core Ideas (DCI) and Model lessons  <b>Day 2</b> - Classroom teachers focus on intervention/enrichment lessons            RTI Teachers focus on logistics and lab delivery  <b>RTI Science Teachers</b>            Comprehensive Summer Training</p>	<p><b>All Teachers/Administrators</b>            -Science and Engineering Practices            -5E Model of Science Instruction (engage, explore, explain, elaborate, evaluate)   <b>RTI Science Teaches</b>            Summer Training</p>	<p><b>All Teachers/Administrators</b>            Curriculum Training including new resources and pacing guides</p>
<b>Curriculum</b>	Use current FOSS materials with modified pacing and lesson structure to align with NGSS	Convene task force to review, pilot and recommend new materials; Continued use of FOSS materials.	Implement new curriculum
<b>Assessment</b>	CALifornia Science Test (CAST) practice tests	Implement a science performance task	Implement district created assessments
<b>Integration of Profile of a Graduate and Capstone</b>	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring	K-4 Grade level focus on profile of graduate skills 5th - Capstone project in spring
<b>Coding and Computer Science</b>	Techsmart Pilot 2 elementary schools;	Possible expansion to 6 elementary schools based on results of the pilot	Possible Expansion to all elementary schools



# Process and Progress- Elementary Option 3

Pros	Cons
Time/consistency in instruction	Changes RTI models at literacy specific sites
Every teacher is trained in NGSS	No new materials until year 3
Incorporates Profile of Graduate, Capstone, NGSS and Coding/Computer Science	Specialized “Science Mindset” experts
Equity of access for all students	Scheduling
Collaboration between classroom teachers and experts at site	Time for collaboration of RTI teachers with classroom teachers
Fewer number of FOSS Kits (RTI Teacher maintains logistics)	Dedicated space for Science RTI implementation
Takes science off teachers’ plates who already have a heavy load	Takes science off teachers’ plates who really enjoy teaching it
Student distribution is more fluid and consistent	Possible staffing challenges - STEAM vs. Science
Developing content area experts	
<b>Fiscal Implication:</b> Costs include cost of RTI teachers, professional development, restructuring pacing guides and lesson structure, curriculum, and TechSmart	

# Process and Progress - Middle School

## Middle School Science 3-Year Plan

**Rationale:** All middle school science teachers should be versed in the three-dimensionality of NGSS standards and the need to teach Inquiry based science using a 5E model (engage, explore, explain, elaborate, evaluate)

**Description:** Engaging science instruction using NGSS aligned materials 4 days a week

	Year 1	Year 2	Year 3
<b>Training Focus</b>	<p><b>Teachers Summer</b> Refine Scope &amp; Sequence Update Common Formative Assessments (CFA) Break down vertical skills/strategies progressions</p> <p><b>Teachers (August)</b> -Phenomena -SEP vertical progressions -SIOP Strategies &amp; HOT Questions</p>	<p><b>Teachers (June)</b> Refine Scope &amp; Sequence Update CFA Analyze effectiveness of vertical skills/strategies teaching integration through <i>student survey</i></p> <p><b>Teachers (August)</b> -CCC -Performance Tasks</p>	<p><b>Teachers (June)</b> Refine Scope &amp; Sequence Update CFA Analyze effectiveness of vertical skills/strategies teaching integration through <i>student survey</i></p> <p><b>Teachers (August)</b> Curriculum Training? New resources and pacing guides</p>
<b>Curriculum</b>	Use current teacher created NGSS aligned curriculum	Convene task force to review, pilot and recommend new materials or to continue with teacher created materials Continue to use NGSS aligned materials	Implement new curriculum <i>if needed</i>
<b>Assessment</b>	California Science Test (CAST) practice tests	Performance Tasks	Implement district created assessments
<b>Integration of Profile of a Graduate and Capstone</b>	<p>Develop 8th grade capstone projects focused on solving real world problems to be completed during a dedicated capstone elective class</p> <p>Develop list of experiences/field trips for 6th and 7th grade related to capstone project topics</p>	<p>Implement capstone projects with mid year and end of year project presentations</p> <p>All 8th grade students will select a Capstone Project elective</p>	Revise and refine capstone projects based on learnings from previous year
<b>Coding and Computer Science</b>	Increase STEAM elective offerings Techsmart coding elective pilot	Assess effectiveness of offerings and decide whether we continue with Techsmart	Assess effectiveness of offerings and decide whether we continue with Techsmart

# Middle School Capstone Project

- All 8th Grade students will complete a capstone project through an elective
- Electives will be real-world problem-solving projects developed by teachers
- Field trips for students in grades 6 and 7 will be developed to provide exposure to project options
- Example:
  - **Solving a city's design needs:** Students will be involved in urban planning. Students can identify a city's issues, relating to things like transportation, the environment, or overcrowding — and design solutions.

# Process and Progress - Middle School

<b>Pros</b>	<b>Cons</b>
Allows students to demonstrate Profile of a Graduate skills through a real world capstone project	An English Learner with a Disability who needs ELD and instructional support may have their Capstone Project as their only elective in 8th grade
Allows students choice in the capstone topic	Teacher interest in developing and teaching capstone project electives
Continues the professional learning of science teachers in NGSS while allowing other content teachers to engage in capstone work	Time for teachers for training and development of capstone projects
New schedule allows this option	
Fiscal Implications: Costs include, costs for professional development, field trips, development of projects, and materials associated with projects	

# Process and Progress - Feedback

February 26: Superintendent review and input

March 4: Cabinet review and input

March 5: Principal review and input

March 11: Science Advisory Committee review of input

March 21: Board of Trustees



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# Recommendation

# Recommendation

## Task Force

- Elementary Option 3 and middle school option with capstone elective

## Cabinet

- Elementary Option 3 and middle school option with capstone elective

## Site Administrators

- Elementary Option 3 and middle school option with capstone elective

## Final Recommendation

- Elementary Option 3 and middle school option with capstone elective



# Progress and Process - Communication

## What we know

- All students will have access to quality science instruction

## What we have learned

- No single option will make everyone happy

## What we need

- Clear communication
- Consistent support of process and decision
- Time to implement, revise and refine the programs



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# Next Steps

# Next Steps

- Communicate final decision to stakeholders
- Work with human resources department to post, interview, and hire Science/STEAM teachers at the elementary level based on the following staffing ratios:
  - 300 students = 1 teacher
  - 450 students = 1.5 teachers
  - 600 students = 2.0 teachers
- Work to develop professional development for all teachers and administrators and to align pacing and materials until new materials can be reviewed, piloted, and adopted
- Convene work group for development of capstone projects for middle school