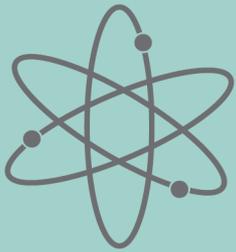


001110010  
1110010111  
110100010  
1111000111  
001101010



$$a^2 + b^2 = c^2$$



# real world, HANDS-ON & integrated

Exploring facilities for STEAM and Career Technical Education



# Introductions

**Laura Knauss, AIA, ALEP, LEED AP**  
Principal, Lionakis

**Kathleen Moore, ALEP**  
Kathleen Moore & Associates

**Bill Heinicke, ALEP, LEED AP**  
Director of Planning, Elk Grove Unified School District



Why CTE?

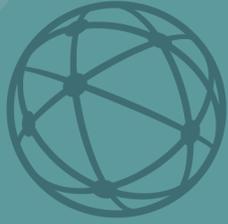
**“All estimates suggest that participation in a high-quality CTE program boosts the probability of on-time graduation from high school by 7 to 10 percentage points for higher income students, and suggestively larger effects for their lower-income peers and students on the margin of being admitted to oversubscribed schools. This work informs an understanding of the potential impact of specific CTE program participation on the accumulation of human capital even in a high-stakes policy environment.”**

The Effect of Career and Technical Education on Human Capital  
Accumulation: Causal Evidence from Massachusetts  
- Shaun M. Dougherty

**“CTE helps prepare young people for success in both postsecondary education and a range of high-wage, high-skill careers and is a critical engine for our economy. Students concentrating in CTE programs graduate high school at higher rates (93%, compared to an average national freshman graduation rate of 80%) and succeed at higher rates in postsecondary education. These courses also provide a high return on taxpayers’ investments, netting the economy at least twice as much in benefits as the students’ training cost.”**

Perkins Reauthorization: An Opportunity to Address Career and  
Technical Education Teacher Shortages  
- Jessica Cardichon





# Not Your Mother's Home Economics...



“We seek the day when every enterprise in **California** - public and private - has access to a pool of talent that both attracts the world’s leading businesses and hastens the development and success of new ones, creating opportunities for all.”

- Tom Torlakson, State Superintendent of Public



# California's Career Technical Education:

## Preparing Students for the 21st Century and Beyond

...has access to a pool of talent that both attracts the world's leading businesses and hastens the development and success of new ones, creating opportunities for all."

"We seek the day when every enterprise in California—public and private—

### INDUSTRY SECTORS

**Engineering and Architecture**

- Architectural Design
- Engineering Technology
- Engineering Design
- Environmental Engineering

**Building and Construction Trades**

- Cabinetry, Millwork, and Woodworking
- Engineering and Heavy Construction
- Mechanical Systems Installation and Repair
- Residential and Commercial Construction

**Transportation**

- Operations
- Structural Repair and Refinishing
- Systems Diagnostics, Service, and Repair

**Fashion and Interior Design**

- Fashion Design and Merchandising
- Interior Design
- Personal Services

**Education, Child Development, and Family Services**

- Child Development
- Consumer Services
- Education
- Family and Human Services

**Hospitality, Tourism, and Recreation**

- Food Science, Dietetics, and Nutrition
- Food Service and Hospitality
- Hospitality, Tourism, and Recreation

**Marketing, Sales, and Services**

- Marketing
- Professional Sales
- Entrepreneurship/Self-Employment

**Arts, Media, and Entertainment**

- Design, Visual, and Media Arts
- Performing Arts
- Production and Managerial Arts
- Game Design and Integration

**Energy, Environment, and Utilities**

- Environmental Resources
- Energy and Power Technology
- Telecommunications

**Health Science and Medical Technology**

- Biotechnology
- Patient Care
- Health Care Administrative Services
- Health Care Operational Support Services
- Public and Community Health
- Mental and Behavioral Health

**Manufacturing and Product Development**

- Graphic Production Technologies
- Machining and Forming Technologies
- Welding and Materials Joining
- Product Innovation and Design

**Business and Finance**

- Business Management
- Financial Services
- International Business

**Agriculture and Natural Resources**

- Agricultural Business
- Agricultural Mechanics
- Agriscience
- Animal Science
- Forestry and Natural Resources
- Ornamental Horticulture
- Plant and Soil Science

**Public Services**

- Public Safety
- Emergency Response
- Legal Practices

**Information and Communication Technologies**

- Information Support and Services
- Networking
- Software and Systems Development
- Games and Simulation



<http://www.cde.ca.gov/ci/ct/st/ctemstandards.asp>

# CALIFORNIA Career Technical Education Model Curriculum Standards



Learning that works for California  
**CTE™**



ADOPTED BY THE CALIFORNIA STATE BOARD OF EDUCATION, JANUARY 2013



**Table 1: CTE Anchor Standards—Common Core English Language Arts Alignment**

| ANCHOR STANDARD   | CCSS ELA Standards Code(s)                   |
|---|--|
| <b>Anchor Standard 1: Academics</b><br>Analyze and apply appropriate academic standards required for successful industry sector pathway completion leading to postsecondary education and employment. Refer to the industry sector alignment matrix for identification of standards.  | Note: alignment listed within each sector    |
| <b>Anchor Standard 2: Communications</b><br>Language Standard: Acquire and accurately use general academic and domain-specific words and phrases sufficient for reading, writing, speaking, and listening at the (career and college) readiness level; demonstrate independence in gathering vocabulary knowledge when considering a word or phrase important to comprehension or expression. | LS 9-10, 11-12.6                             |
| <b>Anchor Standard 3: Career Planning and Management</b><br>Speaking and Listening Standard: Integrate multiple sources of information presented in diverse formats and media (e.g., visually, quantitatively, orally) in order to make informed decisions and solve problems, evaluating the credibility and accuracy of each source and noting any discrepancies among the data.            | SLS 11-12.2                                  |
| <b>Anchor Standard 4: Technology</b><br>Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments and information.   | WS 11-12.6                                   |
| <b>Anchor Standard 5: Problem Solving and Critical Thinking</b><br>Writing Standard: Conduct short as well as more sustained research projects to answer a question (including a self-generated question) or solve a problem, narrow or broaden the inquiry when appropriate, and synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. | WS 11-12.7                                   |
| <b>Anchor Standard 6: Health and Safety</b><br>Reading Standards for Science and Technical Subjects: Determine the meaning of symbols, key words, and other domain-specific words and phrases as they are used in a specific scientific or technical context.   | RSTS 9-10 11-12.4                            |
| <b>Anchor Standard 7: Responsibility and Flexibility</b><br>Speaking and Listening Standard: Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners, building on others' ideas and expressing their own clearly and persuasively.  | SLS 9-10 11-12.1                             |
| <b>Anchor Standard 8: Ethics and Legal Responsibilities</b><br>Speaking and Listening Standard: Respond thoughtfully to diverse perspectives; synthesize comments, claims, and evidence made on all sides of an issue; resolve contradictions when possible; and determine what additional information or research is required to deepen the investigation or complete the work.              | SLS 11-12.1d                                 |
| <b>Anchor Standard 9: Leadership and Teamwork</b><br>Speaking and Listening Standard: Work with peers to promote civil, democratic discussions and decision making; set clear goals and deadlines; and establish individual roles as needed.  | SLS 11-12.1b                                 |
| <b>Anchor Standard 10: Technical Knowledge and Skills</b><br>Writing Standard: Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information.   | WS 11-12.6                                   |
| <b>Anchor Standard 11: Demonstration and Application</b><br>Demonstrate and apply the knowledge and skills contained in the industry-sector anchor standards, pathway standards, and performance indicators in classroom, laboratory, and workplace settings, and the career technical student organization.  | Note: no alignment evident for this standard |

“If current trends continue, roughly one-third of new jobs in **California** will require some training beyond high school but less than a four-year degree.”

“During the 2016-17 school year, close to 800,000 high school students **(45%) enrolled in a CTE course.**”



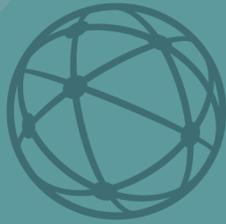
### California Fast Facts

- 6,220,413  
Public School Students
- 1,745,197  
High School Students



**PPIC**

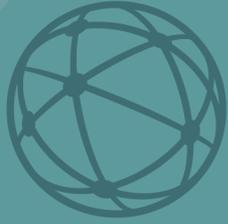
PUBLIC POLICY  
INSTITUTE OF CALIFORNIA



# Purpose:

Through a competitive grant process, the purpose of the Career Technical Education (CTE) Facilities Program is to provide matching funds for the purpose of CTE specific new construction, modernization, and/or equipment.

| Project Requirements   | Maximum Potential Score |
|--|-------------------------|
| Cover Page (Form A)  | 0                       |
| Part 1. Career Technical Education Plan  | 33                      |
| Part 2. Projections of Student Enrollment  | 15                      |
| Part 3. Identification of Feeder Schools and Partners  | 9                       |
| Part 4. The Accountability Plan  | 15                      |
| Part 5. Educational Specifications and Equipment/Space Requirements  | 24                      |
| Part 6. Budget Justification/Detail Sheet (Form B)   | 36                      |
| Part 7. Unique Conditions (If Applicable)  | 3                       |
| Part 8. Overall Feasibility of the project<br><i><b>This is not a category to be addressed by the applicant, but rather a rated area on the scoring rubric for the reviewer.</b></i> | 6                       |
| Total  | 141                     |



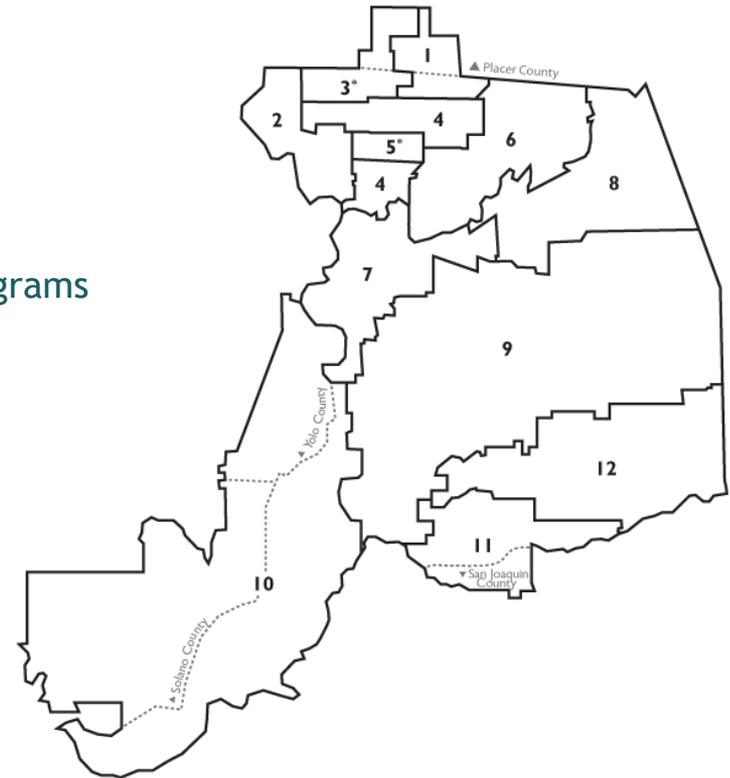
# Case Study: CTE



Elk Grove Unified School District



- 320 Square Miles
- 63,061 Students
- 67 Schools
- # Students in CTE Programs



Can we highlight Sacramento county on the CA map?

# Elk Grove Unified School District

# Career Academy and Pathway Programs

---

## COSUMNES OAKS HIGH SCHOOL

- Culinary Arts Academy (Proposed)
- Architectural Design & Urban Planning (Proposed)
- Visual and Performing Arts (Proposed)

## ELK GROVE HIGH SCHOOL

- Ag-Science Career Pathway
- Auto Technology Career Pathway
- Graphic Arts Career Academy\*(Proposed)

## FLORIN HIGH SCHOOL

- Ag TECH Career Academy
- Auto Technology Career Pathway
- Business Education Technology (BET) Academy

## FRANKLIN HIGH SCHOOL

- School of Technology, Engineering and Media (STEM) Academy

## LAGUNA CREEK HIGH SCHOOL

- Manufacturing Production Technology Academy (MPTA)
- Business Careers Academy
- Sports Careers Academy

## MONTEREY TRAIL HIGH SCHOOL

- Design and Technology Academy (DATA)

## PLEASANT GROVE HIGH SCHOOL

- CADD/Comm Academy
- Public Service Academy

## SHELDON HIGH SCHOOL

- ARTSwork Career Pathway
- Biotechnology Academy
- Engineering Career Pathway
- Equitas Career Pathway

## VALLEY HIGH SCHOOL

- Health TECH Academy
- Careers in Education Management and Training (CEMT) Academy







# Cosumnes Oaks Culinary Academy

STAFFORD, KING WIESE ARCHITECTS

Culinary  
Arts  
Academy



Culinary

Arts

Academy

“All I really need to know I learned in  
**Kindergarten.**”

- Robert Fulghum





1

More Space

2

Flexibility Sit, Stand, Soft

3

Alone, Together, Small

4

“Stuff”

5

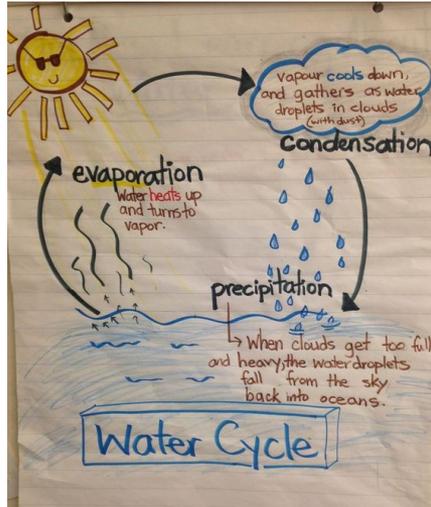
Outdoor Learning

# 5

## Integrated...



Technology



Direct

### Water Cycle Song

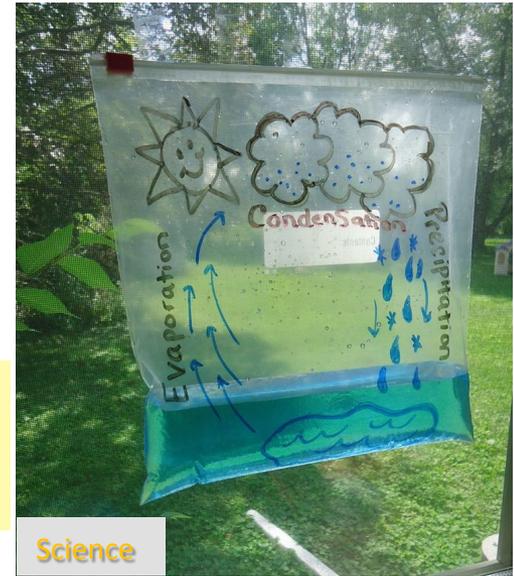
(sing to tune of She's Coming Round the Mountain)

## Free Printable Water Cycle Song

the classroom creative.com

comes in circles as condensation and falls down as precipitation. Yes it does!

Music



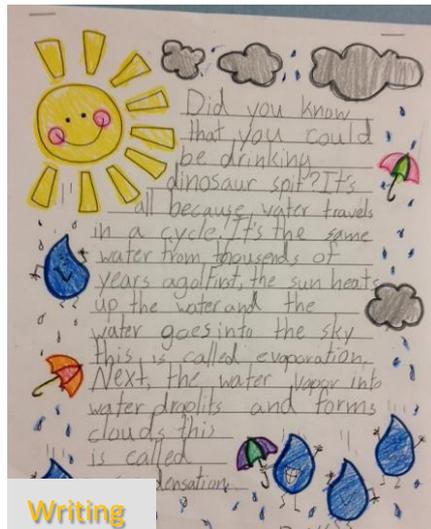
Science

## Roll a Cloud +5

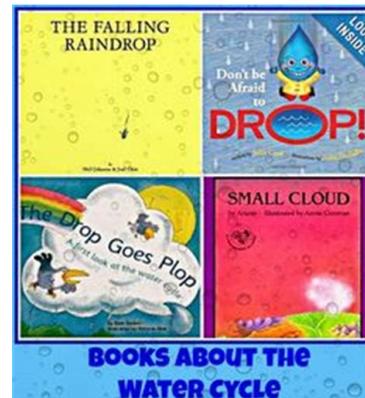
Name: \_\_\_\_\_ Roll one time and add 5 to your number. Color in one cloud with the matching number.

|  |  |  |  |
|--|--|--|--|
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |
|  |  |  |  |

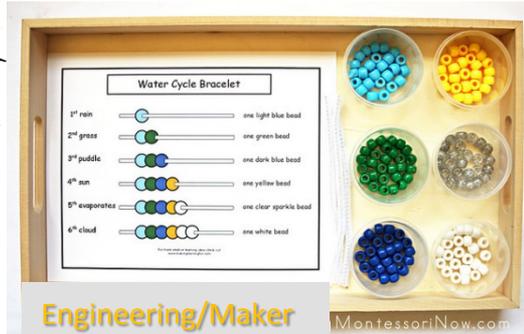
Math



Writing



Reading



Engineering/Maker



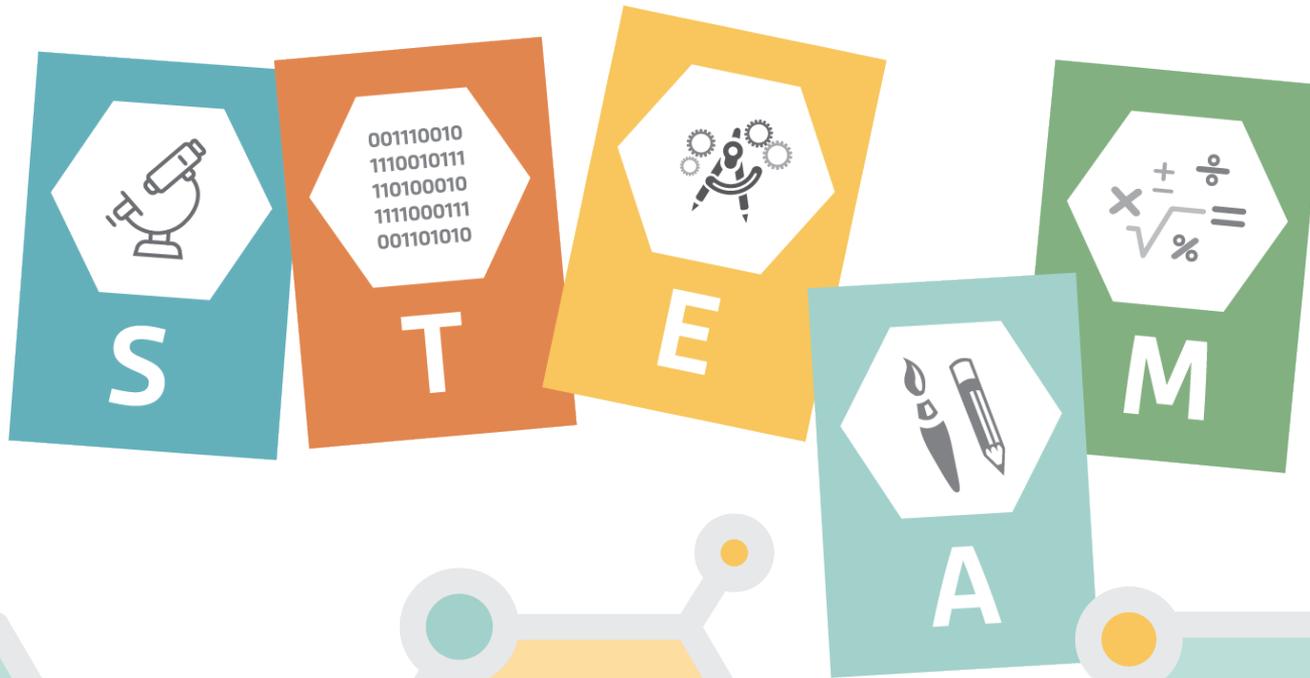
Art

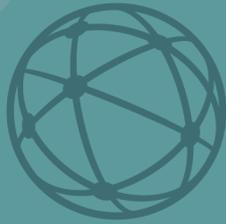




“I have no hesitation in saying we need to add the letter A...and education devoid of the arts ... is an empty, half-brain kind of education.”

- Howard Gardner, Harvard Graduate School of Education

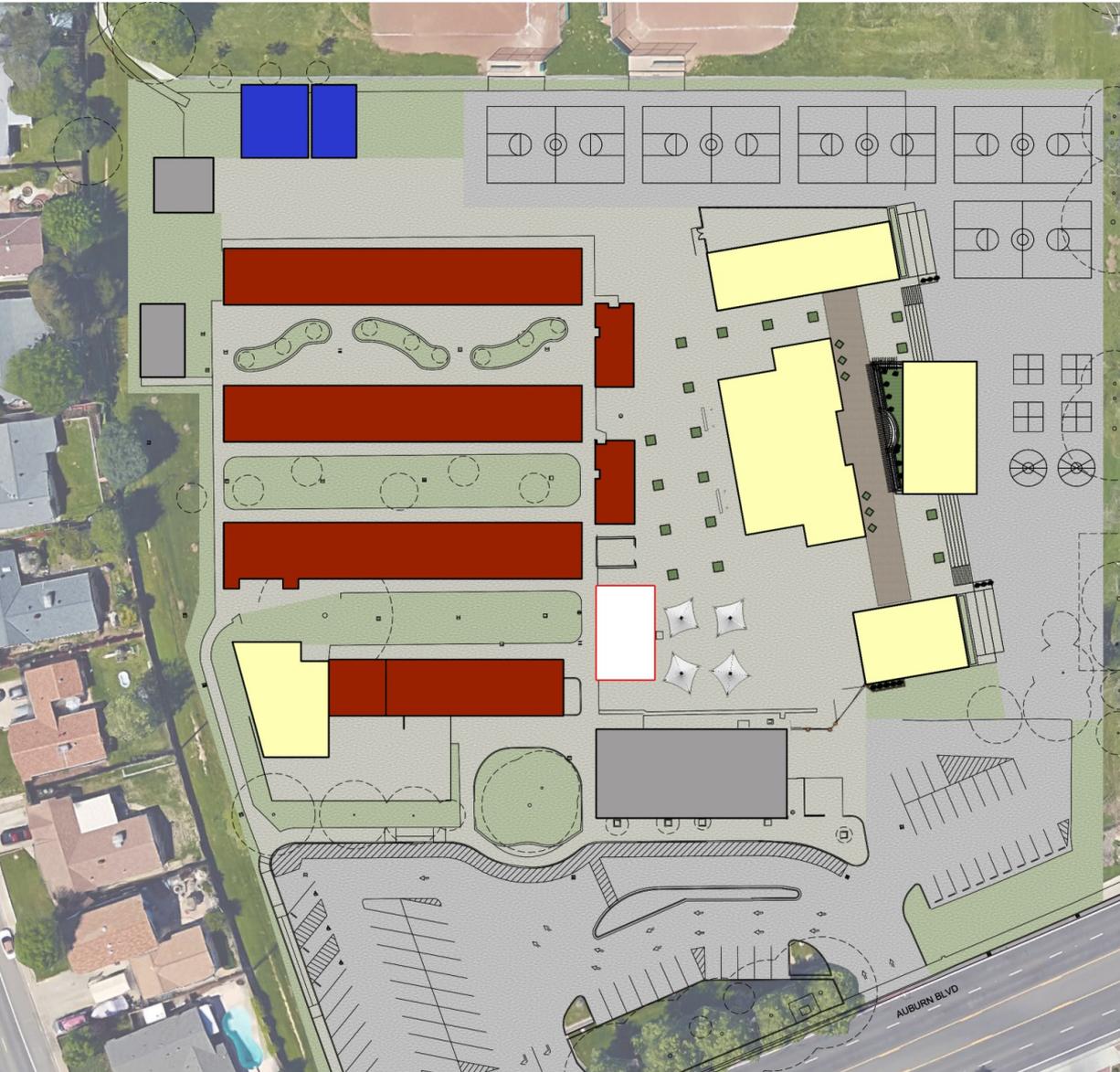




# Case Study: STEAM



Sylvan Middle School San Juan Unified School District



## EXISTING

Renovate 18 Existing Classrooms

Reclaim 2 K-Spaces

Administration Expansion

Media Lab

Relocate 2 portables

Staff Lounge

Classroom

Reuse 2 portables

Textbook Storage

Classroom

Demolish one building

Multi-Purpose/Food Service "as is"

## NEW

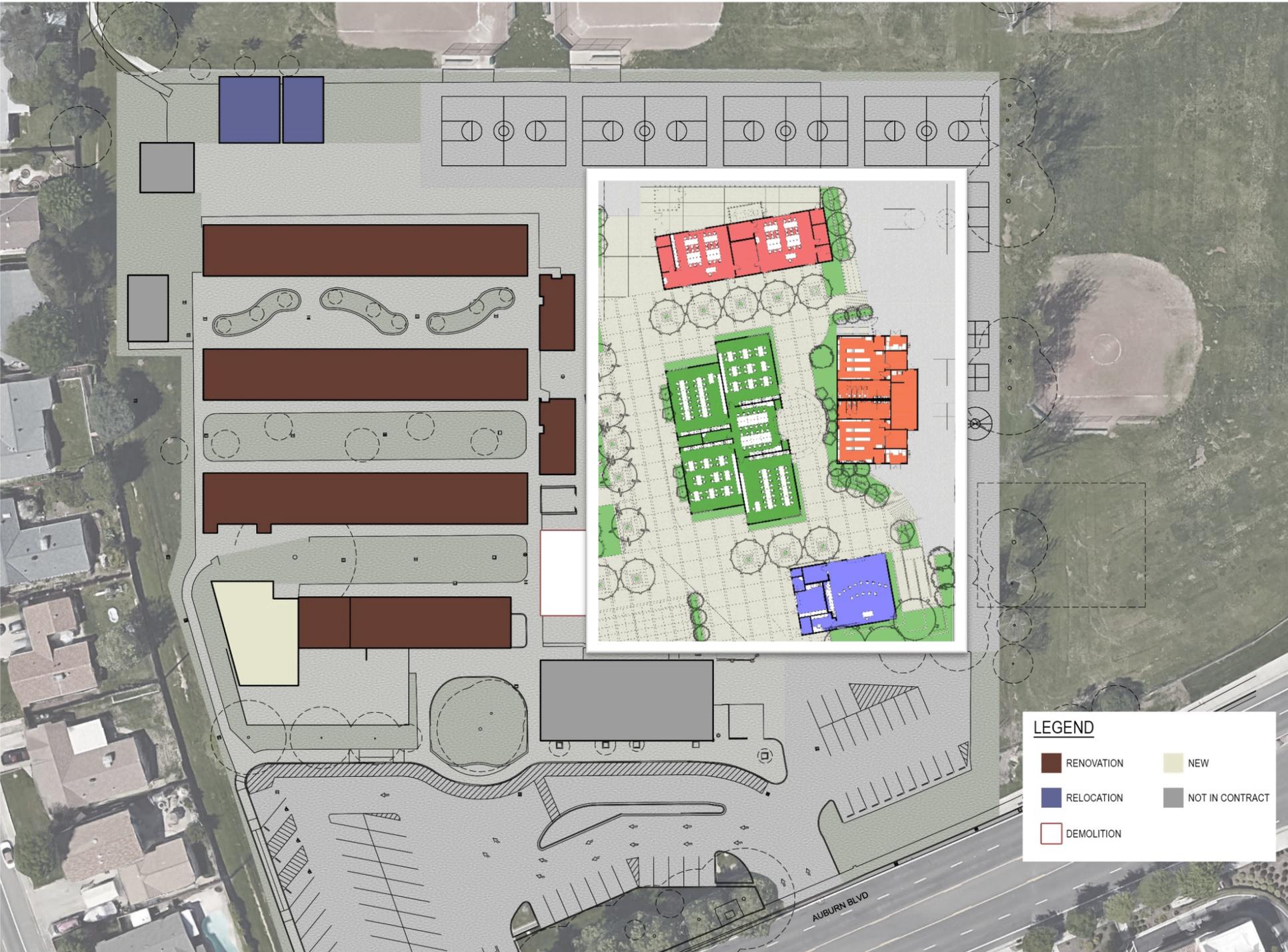
Construct New Labs

Science (4)

Maker Lab

Art Lab

# Site Plan



**LEGEND**

|  |   |
|--|---|
|  RENOVATION |  NEW             |
|  RELOCATION |  NOT IN CONTRACT |
|  DEMOLITION |   |

AUBURN BLVD



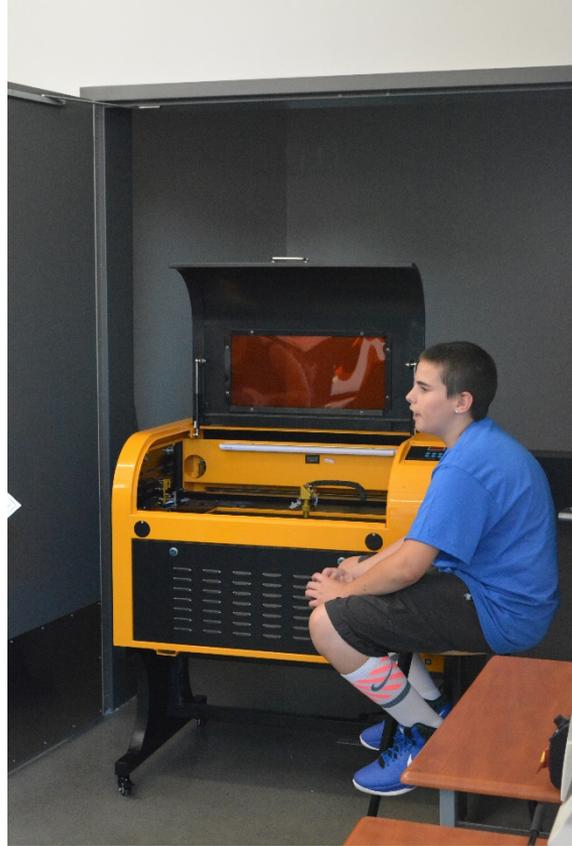
Community STEAM Night



Powered by STEAM

What are the **facilities** lessons of the CO2 Racers?







Flexibility



# Furnishings Matter



Transformed



Transformed



Learning Commons



Powered by STEAM

# So, how do **we** get there?

6,220,414 Students  
1,026 School Districts  
10,473 Schools  
313,989 Teachers

Somewhere around **200,000** Classrooms?



# Incremental Change...

A

Cells and Bells



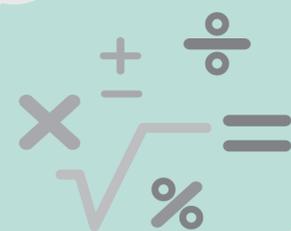
B

Integrate  
Technology  
and Add  
Flexible  
Furnishings



C

Create A Few  
Demonstration  
Spaces





Balance  
Ball

Desks on Risers

Cushions  
on tires

...Or Rely on Teacher Hacking?



...Or the Big Bang?

TELL ME AND I  
**FORGET.**

---

TEACH ME AND I  
**REMEMBER.**

---

INVOLVE ME AND I  
**LEARN.**

- B E N J A M I N F R A N K L I N

Real world, hands-on and integrated

10:30 to Noon

Friday, November 2

Salon 12

0 -10 minutes      Slides 1 – 4 (Laura)

10 – 20 minutes      Slides 5 – 9 (Kathleen)

20 – 45 minutes      Slides 10 – 15, including Skype (Bill)

45 – 65 minutes      Slides 16 – 33 (Laura/Kathleen) – see notes page

65 – 75 minutes      Slides 34 –38 (Kathleen/Laura) – see notes page

75 – 90 minutes      Q & A