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 Instruction
California’s Career Technical Education: Preparing Students for the 21st Century and Beyond

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

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

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

Business and Finance
- Business Management
- Financial Services
- International Business

Public Services
- Public Safety
- Emergency Response
- Legal Practices

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

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

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

Colors and logos: Engineering and Architecture (gray), Building and Construction Trades (orange), Transportation (blue), Fashion and Interior Design (pink), Education, Child Development, and Family Services (purple), Hospitality, Tourism, and Recreation (yellow), Marketing, Sales, and Services (red), Energy, Environment, and Utilities (green), Health Science and Medical Technology (blue), Agriculture and Natural Resources (green), Business and Finance (white), Public Services (green), Arts, Media, and Entertainment (blue), Manufacturing and Product Development (blue), Information and Communication Technologies (orange)

CTE logo: Learning that works for California
Table 1: CTE Anchor Standards—Common Core English Language Arts Alignment

<table>
<thead>
<tr>
<th>Anchor Standard</th>
<th>Common Core State Standards (CCSS)</th>
<th>Key Concepts</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anchor Standard 1: Reading</td>
<td>CCSS.ELA-Literacy</td>
<td>Read and comprehend various genres, including informational texts.</td>
</tr>
<tr>
<td>Anchor Standard 2: Writing</td>
<td>CCSS.ELA-Literacy</td>
<td>Write arguments to support claims with evidence.</td>
</tr>
<tr>
<td>Anchor Standard 3: Speaking and Listening</td>
<td>CCSS.ELA-Literacy</td>
<td>Engage effectively in collaborative tasks.</td>
</tr>
</tbody>
</table>

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https://www.cde.ca.gov/ci/ct/sf/ctemcstandards.asp
“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
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.

<table>
<thead>
<tr>
<th>Project Requirements</th>
<th>Maximum Potential Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cover Page (Form A)</td>
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<tr>
<td>Part 1. Career Technical Education Plan</td>
<td>33</td>
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<tr>
<td>Part 2. Projections of Student Enrollment</td>
<td>15</td>
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<td>Part 3. Identification of Feeder Schools and Partners</td>
<td>9</td>
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<tr>
<td>Part 4. The Accountability Plan</td>
<td>15</td>
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<tr>
<td>Part 5. Educational Specifications and Equipment/Space Requirements</td>
<td>24</td>
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<tr>
<td>Part 6. Budget Justification/Detail Sheet (Form B)</td>
<td>36</td>
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<tr>
<td>Part 7. Unique Conditions (If Applicable)</td>
<td>3</td>
</tr>
<tr>
<td>Part 8. Overall Feasibility of the project</td>
<td>6</td>
</tr>
</tbody>
</table>

*This is not a category to be addressed by the applicant, but rather a rated area on the scoring rubric for the reviewer.*

Total 141
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?
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
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
Integrated...

Roll a Cloud +5

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

Math:

11, 10, 6, 8, 9, 7, 11, 9, 8, 8, 7, 10, 8, 7, 11, 6

Art:

Direct:

Reading:

Water Cycle Song

Water Cycle: evaporation, condensation, precipitation, evaporation, condensation, precipitation

Did you know that you could be drinking dinosaur spit? It's all because of the water cycle! Water flows through all years against the sun, heats up the Earth, and the water goes into the sky. This is called evaporation. Next, the water drops into water drops into water drops into water drops into the cloud. This is called condensation.

Music:

Water Cycle: evaporation, condensation, precipitation, evaporation, condensation, precipitation

Books About the Water Cycle

Engineering/Maker:

Technology:

MontessoriMan.com
“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
Powered by STEAM
What are the facilities lessons of the CO2 Racers?
Flexibility
Furnishings Matter
SYLVAN MIDDLE SCHOOL

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
...Or Rely on Teacher Hacking?
...Or the Big Bang?
TELL ME AND I FORGET.
TEACH ME AND I REMEMBER.
INVOLVE ME AND I LEARN.

-BENJAMIN FRANKLIN
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