STRENGTHENING THE K-12 STEM TEACHER PIPELINE IN CALIFORNIA
TODAY’S PRESENTERS

- Eric Hoyer, Consultant, CSBA
- Mary Briggs, Education Policy Analyst, CSBA (Moderator)
STRENGTHENING THE STEM TEACHER PIPELINE

Eric Hoyer
Consultant, CSBA
GOALS

- The extent of the teacher shortage in STEM
- Contributing factors to the recruitment and retention issues faced by LEAs.
- Promising strategies and policies
- Questions for board members
Projected growth rates for types of STEM occupations, 2014 to 2024

- Mathematical science occupations: 25.4%
- STEM-related postsecondary teachers: 19.4%
- Computer occupations: 17.6%
- STEM-related management: 10.1%
- STEM-related sales: 7.8%
- Physical scientists: 6.0%
- Life scientists: 4.9%
- Architects, surveyors, and cartographers: 4.2%
- Life and physical science technicians: 3.8%
- Engineers: 3.5%
- Drafters, engineering technicians, and mapping technicians: 1.5%

WHAT EDUCATION STEM JOBS REQUIRE

### Top 15 Fastest Growing Jobs 2016 - 2026 and Median Salaries

<table>
<thead>
<tr>
<th>Rank</th>
<th>Job Description</th>
<th>Median Salary</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Personal Care Aides</td>
<td>$24,419</td>
</tr>
<tr>
<td>2.</td>
<td>Food Prep and Serving</td>
<td>$25,232</td>
</tr>
<tr>
<td>3.</td>
<td>Transportation and Material Moving</td>
<td>$32,260</td>
</tr>
<tr>
<td>4.</td>
<td>Healthcare Practitioners</td>
<td>$86,619</td>
</tr>
<tr>
<td>5.</td>
<td>Construction and Extraction</td>
<td>$54,394</td>
</tr>
<tr>
<td>6.</td>
<td>General and Operations Managers</td>
<td>$117,727</td>
</tr>
<tr>
<td>7.</td>
<td>Business and Financial Specialists</td>
<td>$75,454</td>
</tr>
<tr>
<td>8.</td>
<td>Computer and Math Jobs</td>
<td>$102,034</td>
</tr>
<tr>
<td>9.</td>
<td>Education and Training</td>
<td>$55,302</td>
</tr>
<tr>
<td>10.</td>
<td>Healthcare Support Jobs</td>
<td>$34,983</td>
</tr>
<tr>
<td>11.</td>
<td>Administrative Support Staff</td>
<td>$39,132</td>
</tr>
<tr>
<td>12.</td>
<td>Retail and Wholesale Sales</td>
<td>$31,001</td>
</tr>
<tr>
<td>13.</td>
<td>Building and Grounds Cleaning and Maintenance</td>
<td>$30,108</td>
</tr>
<tr>
<td>14.</td>
<td>Software App Developers</td>
<td>$123,085</td>
</tr>
<tr>
<td>15.</td>
<td>Registered Nurses</td>
<td>$102,288</td>
</tr>
</tbody>
</table>

California Employment Development Department: [https://www.labormarketinfo.edd.ca.gov/OccGuides/FastGrowingOcc.aspx](https://www.labormarketinfo.edd.ca.gov/OccGuides/FastGrowingOcc.aspx)
CALIFORNIA’S NEED FOR BACHELOR’S DEGREE HOLDERS

Figure 1. Demand for highly educated workers will exceed supply in 2030

SOURCE: Authors’ projections.
NOTE: See the technical appendices for data and methods.
RECRUITMENT AND RETENTION

- New Teachers
  - 26% to 50% leave within 5 years

- Teacher Turnover Costs
  - $9 billion per year (nationally)
  - 67% of turnover is non-retirement

Source: Learning Policy Institute
75% of districts reported having a shortage of qualified teachers

4 of 5 districts say the problem has gotten worse in recent years (2016)

n=200

76% of HR staff reported having teacher shortages (2018)

n=206

Source: Getting Down to Facts II
STEM TURNOVER

<table>
<thead>
<tr>
<th>Subject</th>
<th>All Teachers</th>
<th>Not HQT Teachers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathematics</td>
<td>19.1%</td>
<td>25.6%</td>
</tr>
<tr>
<td>Science</td>
<td>18.5%</td>
<td>30.4%</td>
</tr>
<tr>
<td>English</td>
<td>18.4%</td>
<td>27.1%</td>
</tr>
<tr>
<td>Social Studies</td>
<td>16.7%</td>
<td>22.8%</td>
</tr>
<tr>
<td>World Language</td>
<td>17.9%</td>
<td>32.0%</td>
</tr>
<tr>
<td>Self-Contained</td>
<td>14.8%</td>
<td>30.5%</td>
</tr>
</tbody>
</table>

Note: Self-contained classes include both elementary school classrooms and special education classrooms. Not HQTs, or not highly qualified teachers, are teachers who did not meet the designation of “highly qualified” under the former federal education law, No Child Left Behind. A highly qualified teacher in California is defined as a teacher who holds a bachelor’s degree, a teaching or intern credential, and has demonstrated core academic subject-matter competence. In this analysis, not highly qualified teachers are teachers who lack an appropriate subject-matter credential for the courses they teach.

Source: California Staffing Data File analyzed by the Learning Policy Institute, provided by the California Department of Education through a special request.

Analysis: Learning Policy Institute, 2018
NEW HIRES IN STEM

Estimated New Hires in CA, 2015-16 to 2020-21
Math & Science

Source: Commission on Teacher Credentialing, 2020
ALL NEW HIRES, 2002-2016

Estimated new hires in California, 2001-02 to 2015-16

© 2016 The Learning Policy Institute

Analysis: Learning Policy Institute, 2018
WHY TEACHERS LEAVE (NON-RETIREMENT)

<table>
<thead>
<tr>
<th>Top Reasons Teachers Leave</th>
<th>Key Finding for Leaving the Profession</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inadequate Preparation of Novice Teachers</td>
<td>2.5x more likely</td>
</tr>
<tr>
<td>Lack of Support</td>
<td>2x more likely</td>
</tr>
<tr>
<td>Challenging Working Conditions (e.g. lack principal support, time for teacher collaboration)</td>
<td>Often the top reason</td>
</tr>
<tr>
<td>Compensation</td>
<td>Beginning teachers earn 19% less than their BA holding peers</td>
</tr>
<tr>
<td>Better Career Opportunities</td>
<td>1 in 4 teachers pursue other career options</td>
</tr>
</tbody>
</table>

Source: LPI (2016)
WHY A TEACHER MIGHT RETURN

- Salary (67%)
- Smaller class size (61%)
- Student Loan Forgiveness, Housing Incentives (25% each)
- Retirement portability (68%)
- Simpler recertification requirements; transfer certification between states (41% each)

Source: LPI (2016)
TEACHER COMPENSATION COMPARISON (NATIONALLY)

1994
2%
Behind average BA holder

2019
19%
Behind average BA holder

Source: National Education Association
NON-TEACHER STEM PROFESSIONALS COMPARED TO TEACHERS

➢ By mid-career: 40% to 50% wage premium over K-12 teachers.

Source: Brookings Institute (2019)
CONSTRAINTS IN RAISING COMPENSATION

- Overall funding level for K-12 education
- Collective Bargaining Agreements provisions can limit differential pay
- Hiring bonuses for STEM teachers are only specified in 1% of California CBAs.
  - Hard to recruit areas: 30%
  - Special Education: 25%
## Table O: Total Enrollment by Teacher Preparation Program Systems, 2017-18

<table>
<thead>
<tr>
<th>IHE Segment Type</th>
<th>Number of Enrolled candidates</th>
<th>Number of Program Completers</th>
<th>Total Enrolled and Program Completers</th>
<th>Percent of Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>California State University</td>
<td>7,960</td>
<td>6,252</td>
<td>14,212</td>
<td>37.8%</td>
</tr>
<tr>
<td>University of California</td>
<td>374</td>
<td>756</td>
<td>1,130</td>
<td>3.0%</td>
</tr>
<tr>
<td>Private/Independent College and Universities</td>
<td>15,564</td>
<td>5,153</td>
<td>20,717</td>
<td>55.2%</td>
</tr>
<tr>
<td>District Intern/COE</td>
<td>1,056</td>
<td>442</td>
<td>1,498</td>
<td>4.0%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>24,954</strong></td>
<td><strong>12,603</strong></td>
<td><strong>37,557</strong></td>
<td><strong>100.0%</strong></td>
</tr>
</tbody>
</table>

*Note: Data include program enrollment and program completers in Academic Year 2017-18.*
RECENT INCREASE IN TEACHER CANDIDATES

Enrolled Teacher Candidates

<table>
<thead>
<tr>
<th>Year</th>
<th>Candidates</th>
</tr>
</thead>
<tbody>
<tr>
<td>2013-14</td>
<td>18,984</td>
</tr>
<tr>
<td>2017-18</td>
<td>24,954</td>
</tr>
</tbody>
</table>

Source: CTC
TEACHER CANDIDATES ENROLLED, 2002-16

Enrollment in Teacher Preparation Programs Remains Low

Number of California teacher preparation program enrolled candidates, 2001–02 to 2015–16

Source: California Commission on Teacher Credentialing. Data available at http://www.ctc.ca.gov/reports/data/titleill-prog-info.html. Data from 2015–16 was provided by the CTC through a special request.
STEM SPECIFIC

- Education mismatch – STEM majors and teacher preparation programs
- Culture of STEM departments
- UTeach – STEM majors + teacher preparation (UC Berkeley, UC Irvine)
CREDENTIALING

- Ensure teacher quality by upholding consistent standards
- Often cited barriers to credential:
  - Testing
  - Paperwork (out of state, private school)
  - Cost
Figure 7: Trends in Mathematics and Science Teacher Supply

Credentials and permits issued, 2011-12 to 2014-15

Source: California Commission on Teacher Credentialing.
©2016 The Learning Policy Institute.
TESTING

- California Subject Examinations for Teachers (CSET)
- Passage rates are often low have disparate results in STEM areas.
MATHEMATICS (FOUNDATIONAL) 2003-15

- Overall passage rate: **50.5%**
- White: 52%
- Native American: **38%**
- Hispanic American: **43%**
- Asian American: 59%
- African-American: **35.6%**

Source: CTC
SCIENCE (FOUNDATIONAL) 2003-17

- Overall passage rate: 58.7%
- White: 64.5
- Native American: 65.5
- Hispanic American: 42%
- Asian American: 60%
- African American: 29%

Source: CTC
AB 2485

- Under consideration by Asm. Education Committee
- Allow candidates to waive the CSET through coursework, subject matter program or other subject area examination.
STRATEGIES AND POLICIES
COMPENSATION
13 governors have proposed raising teacher pay

Presidential candidates included in platform

Statewide solution due to teacher mobility

ESSA Title II-A high poverty schools

Differential pay to meet need
LOAN FORGIVENESS/GRANTS

- Average bachelor’s degree holder is $20,000 in debt (CA)
- Teacher preparation and induction is an additional cost ~ $15,000
- Assumption Program of Loans for Education (APLE): 1983-2013
- Carolinas >teachers fellows program
  - Scholarship towards BA and credential
  - Four year teaching commitment
  - 70% of graduates are still teaching after 5 years
  - NC program = 10% of all teachers trained in the state, retention rate exceed that of other preparation options.
- California: Governor’s Teaching Fellowship (2000-2004)
We lack teacher career tracks that compete financially with the lure of becoming a school administrator. In most places now, the pathway to higher compensation eventually leads out of the classroom.

Ariel Sacks, middle school teacher (EdWeek, 2019)
ADVANCEMENT PAY

- Career ladder models
- Promote mentoring and coaching through incentive pay
- Keeps experienced teachers in the classroom
- Increases the number of mentors for novice teachers
- Rochester, Cincinnati have had long standing programs
- National Board Certification (NBC) recognition
PREPARATION
GROW YOUR OWN PROGRAMS

- **Grow Your Own**: recruit high school or college students or community paraprofessionals to become teachers.
  - Provides support for undergraduate education as well as teacher preparation. Can be general or tailored to need. California Paraprofessional Teacher Training Program: bilingual, SpEd or district identified area of need.

- California Classified School Employee Teacher Credentialing Program (2016-forward)

- Out of state: NC and SC Teacher Cadet Program: offers high school course (with college credit). SC program is over 30 years old; 1 of 5 cadets earn a credential, cost is $100/student
STEM TEACHER RESIDENCIES

- Residency: Ongoing support for BA/teacher education in exchange for years of service.
  - Additional benefits: mentoring, local need, often more diverse teachers.

- LAUSD – CSU Dominguez Hills (STEM Teacher in Advanced Residency- STAR) – single subject credential plus masters.

- Bakersfield USD – CSU Bakersfield (Elementary STEM)
  - Kern Union- 95% retention rate after 3.5 years

- $30,000 stipend, plus $4,000 grant
LOCAL/REGIONAL STRATEGIES
SUPPORTING PROFESSIONAL LEARNING

- **Top Reasons Teachers Leave**
  - Inadequate Preparation of Novice Teachers
  - Lack of Support
  - Challenging Working Conditions (e.g. lack principal support, time for teacher collaboration)

- Both math and science have newer standards
  - Requires deep professional learning-CSBA video
  - Support from principals
COLLABORATION WITH TEACHER PREPARATION PROGRAMS

- source of data: who your future teachers are; what do they expect as teachers?
- Faculty may be able to assist LEAs on attrition and recruitment strategies
- College of Ed collaboration with undergraduate math and science department
RETIRRED TEACHERS

- Immediate source of labor
- Able to fulfill a mentoring role
- Average age at retirement: 61.5 years
- Earnings cap: $47,713 [2020-21]
- A contribution model could be revenue neutral.

Sources: CalSTRS, LPI
HIRING

- Timing of hiring
- Weak hiring processes (lack of vetting, enough time for teaching demonstrations)
- Disparities in hiring timing
## HIRING TIMELINES

<table>
<thead>
<tr>
<th>Longer posting periods</th>
<th>Higher vacancies/1000 students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lower achieving LEAs (~11 days longer)</td>
<td>Lower achieving LEAs (12% more)</td>
</tr>
<tr>
<td>Urban districts</td>
<td>Rural districts (almost 2x of urban districts)</td>
</tr>
<tr>
<td>LEAs further away from a teacher preparation program</td>
<td>Border districts</td>
</tr>
</tbody>
</table>

Source: Getting Down to Facts II
NOT JUST QUANTITY

- Teacher workforce that supports a diverse student population
- Increased test scores
- Improved graduation rates
- Less chronic absenteeism
- Greater self-esteem

Source: Diversifying the Teaching Profession: How to Recruit and Retain Teachers of Color, Thomas-Carver, D. LPI, 2018
QUESTIONS TO CONSIDER

- Where do your new teachers get prepared?
- What kind of data on teacher attrition is available?
- What is your local CSU/prep program doing to prepare STEM teachers?
- How do you use retired teachers?
- Does your hiring needs reflected in your incentives? (CBA)
LINKS TO MORE RESOURCES

Learning Policy Institute (LPI)
Diversifying the Teaching Profession: How to Recruit and Retain Teachers of Color Report

The Teacher Residency Model: An Innovative Model for Preparing Teachers Report

Why Do Teachers Leave? Infographic

Understaffed and Underprepared: California Districts Report Ongoing Teacher Shortages Brief

Getting Down to Facts/PACE:
Teacher Staffing Challenges in California: Exploring the Factors that Influence Teacher Staffing and Distribution report

Teacher Shortages in California: Status, Sources, and Potential Solutions (includes video)


Kern Rural Teacher Residency https://bit.ly/2UPHa1T
QUESTIONS
THANK YOU TO THE S.D. BECHTEL JR. FOUNDATION

During 2018-20, CSBA has been fortunate to have much of its STEM work supported by the S.D. Bechtel Jr. Foundation.

This funding has allowed CSBA to develop videos, an online course, and several briefs related to STEM.
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