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Recruitment and Retention Working Group

CSEWI and ARCHES (Alliance of Regional Collaborations for Heightened Educational Success) thank all working group participants for their time, insight and input at our December 9 STEM CAP Forum. I believe we are off to a very good beginning, I request that you do two things:

(1) Please review your working group assignment in the attached roster and email Teresa Henderson with any working group changes:

teresa.henderson@csewi.org.

(2) Please find below rough "first notes" from each of the three working group sessions. You will see that working group inputs have been arranged to align with the four categories of a STEM-related continuum outlined at the Forum: Inspire, Engage, Educate, Employ. These are rough notes and more complete working group session recaps will be forwarded by the end of January.

Before then, the facilitators ask that you review these first notes and provide any comments by January 15, to ensure incorporation into the complete recap. We especially welcome your comments on the draft goal statements and the criteria for STEM CAP program models/best practices. To accelerate the feedback, we ask that you forward comments directly to the facilitators:

Recruitment/Retention: Victoria Conner (v.conner@strategicvitalityllc.com)

STEM Curriculum: Diane Siri (iris1996@aol.com)

STEM Transitions: Dennis Galligani (galligani@arches-cal.org)

Recruitment/Retention Working Group Notes

Draft Goal Statement:

Increase number of STEM graduates and educators by using all available resources (public and private) to build awareness of students, teachers and parents of the breadth, scope and quality of life benefits of STEM-related careers, addressing bi-lingual and gender issues and the perceived "inaccessibility" of the lab scientist image by providing opportunities at every level to engage with 21st Century STEM workers and in challenging, relevant, hands-on STEM-related activities capitalizing on the excitement of experiential learning and the satisfaction of the inquiry and project-based methods of study.

INSPIRE

Consider addressing bi-lingual and gender issues in all of the following:

Bring all resources to table: education, industry, informal science

Show relevance of STEM to 21st Century issues, e.g. global warming

Counter perceived and real difficulty of STEM study with image-breaking fun-looking STEM work

Introduce teachers, parents and students to the breadth of STEM careers, not just lab scientist

- show fieldwork, labwork, space work, environmental work – variety of industries, professions

Build awareness campaign on:

- student interests (e.g. industry sports campaign using STEM to enhance performance, building things, global warming, etc.)

Target parent groups (PTA, homeschoolers, etc.) for STEM career orientations

- articulate vast array of STEM careers – all levels (community college – university)
- share support resources (parents afraid they won't be able to help with homework)
- parent/student field trips
- have them meet real STEM workers in all walks of life

Target students who think they can't get to college

- Share project-based, experiential side of STEM
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Project-based learning, experiential learning is an attractor

Some kids want “big money” – show financial benefits of STEM careers

Target first generation to go to college

Create a “value proposition” for STEM

Support CCST suggestion that Governor serve as champion for STEM

Recruit role models

Show “ROI” of STEM

Statewide campaign, not just regional

Use positive impression, e.g. news clips, conference addresses, etc. to evaluate success (or media time/dollars)

Field trips and bringing field trips to schools

Measuring Longterm Success

- Enhanced perceived value of STEM careers

ENGAGE

Employ project-based and experiential learning

Engage retirees as resources – retirees don't want full time teaching positions (younger retirees or displaced workers may)

Make STEM teaching something special – teacher as scientist, offer off-site opportunities (industry, informal science, universities – not just professional development, but personal development along interest lines)

Address “what's the point?"/constantly show relevance

Emphasize success in STEM, achievability, value of STEM careers (counter “inaccessibility, fear)

Relate science and technology to everyday life – relevance
Use technical mentors in classroom (to engage students, support teachers)
Recruit SMEs (subject matter experts)
Source of Volunteers – Future Scientists and Engineers
Capitalize on pre-service teacher opportunities
Have elementary/high school students take classes at University
Adjunct Teacher Corps – have S & Ts part of Corps to support
Have kids identify/address through STEM the problems facing their generation –
personalize the critical importance of being prepared to take over the world
Special programs needed for girls as they enter middle school – no social
relevance for them in STEM
Teacher communities – pull M & S teachers (as scientist model), integrate math
and science to address real world problems, opportunities
Lego League
Involve more family in field trips, math and science activities
Passport to future, AIAA brochure

EDUCATE

Apply business/HR research on job satisfaction to STEM retention issue
(motivation, etc.)
Students need three aspects for success in STEM careers: technical, business,
real world (experiential) understanding
Society does not recognize STEM as important; increase society's value of
STEM

- Mirror for 6 weeks to 1 year, pedagogy/paradigm shift
- US views/teaches science as absolute, not applied
- Stop and reverse decline

Saturday and after-school programs
Ombudsman to translate
Example: El Camino Space and Science Day

- First Robotics
- Family

Different strategies, different audiences
15 scans/CDE standards
No mandated minutes except PE (CDE clarification re: mandated schoolday
subject times)
Identify potential STEM students early
Build awareness of Legislature/Governor for critical importance/support of STEM
education
Create/legislate plan to address all layers and elements concurrently, not
propose individual programs, isolated solutions, etc.
Start student teaching earlier; socialize teachers during induction phase, sustain
entering teacher collaboration
Evaluation models/tools identified to measure progress

“Live a field trip” – relate to everyday life

Measuring Long-Term Success

- CSU, reduced req'd number of units through articulation
- Identification of potential STEM ____ (?) at community colleges (programs? Students?)
- Legislative support for STEM education
- California headcount – grads, students, teachers

EMPLOY

Outreach to and orient counselors and graduate advisors

Apply HR research to retention

- Relevance – do they know how they fit into “big picture”?
- Confidence in the leadership of organization?
- Do I feel valued, are they investing in me?
- Etc.

Support new STEM professionals with new professionals groups, activities, mentoring

Address issue of STEM major “drop-outs” – identify and attract into other STEM options (e.g. physics to biology, industry to teaching, scientist to lab technician)

Offer incentives to teach in tough districts

Measures/sustainability

Teacher collaboration for retention

Pedagogy

Internship/externship

Parallel: Pedagogy/content

Measuring Long-Term Success

- Increase number/quality of STEM workers

CRITERIA FOR BEST PRACTICES, MODEL PROGRAMS

- For metrics, use SMART: Specific, Means, Achievable, Relevant, Time Based
- Leverage of resources
- Hands-on
- Experiential
- Industry-Relevant
- Inquiry and/or Project-based
- Leadership Capacity
- Impactful Objectives: Audience identified/assessments
- Third party evaluation performed
- Replicability
- Teaming
- Cost-Effective
- Measurable results
- ART – Achievable, Relevant, Time-Based
- Accountability

- Contribution to deep understanding
- Demonstrated value
- 21st Century Workforce Relevance
- Collaboration – beyond mere partnering
- Appropriateness
- Sustainability
- Systemic
- Scalability
- Both qualitative and quantitative objectives
- Transferability
- Not dependent upon one champion or SME or founder for future success

Measures/Outcomes to evaluate success within this area (under WIRED)?

- Define deliverable
- Positive Impressions (media coverage, conference presentations, etc.)
- Evaluation models/tools identified
- Recommendation of metrics/baseline
- Amount of new partnerships, collaborations
- Changes in programs

Other individuals/organizations to engage?

- California School Boards Assn.
- California Math Council
- County Science and Math Coordinators
- County Supts
- Professional Student?
- CTC (CA Teacher Credentialing)
- IWITTS (Inst. For Women in Technology Trades and Sciences)
- California Business Roundtable
- Military
- Media – CA Media Council
- CalSpace Institute
- CTA?
- AFTA?
- HR reps
- TechNet (Nano, Info, Bio)
- CASUH
- Boy and Girl Scouts
- Professional Assns
- HR professionals
- Nonprofits – UW
- Parent groups, student groups

- Informal science group
- CISC
- Professional Science Assn

ADDITIONAL NOTES

Kids turned off by constant testing, “standards” learning has taken over

Need resources to attract – equipment, labs, etc.

Hidden jobs, only “common” careers are visible

Three-quarters of all professions use math and science literacy skills

“Hardness” of STEM path – media influence is that sports, rock ‘n roll easier

Parents and community influence career decisions – must get to parents for STEM support

- College is the only way (misperception)
- Can’t see incremental steps (can’t imagine kid as lab scientist)
- “inaccessibility” of STEM careers creates an obstacle

Policy decisions based on anecdotal information; need more rigorous research, dissertations – what new research is needed?

STEM teacher is a secondary pathway not much discussed as option for STEM students/grads

Disconnect between policy and need

Standards are a checklist, not inquiry-based or design-based

State Board, CA standards more strict than national standards

Increase systems approach; identify and address root causes

Matrix strategic components (students, parents, teachers, industry, informal science, culture) to the four areas: Inspire, Engage, Educate, Employ

Field trips are a liability/time issue now