Equity and Access in K-12 STEM Education for ALL Students

Mary Margaret Capraro, Robert M. Capraro, Jim Morgan, Ingrid Campos, April Martin, Brittanei Cain
(Undergraduate Research Assistants)

Recommendations:

1. Monitors students cognitive, behavioral & emotional engagement
2. Create opportunities for students to develop all three
3. Encourage after-school activities
4. Create lessons that integrate inquiry & PBL in all disciplines
5. Embed academic skills & behaviors
6. Nurture partnerships with local businesses & universities to expose students to career & college opportunities after high school
7. Provide career exploration tools

2. Create opportunities for students to
3. Encourage after-school activities
4. Create lessons that integrate inquiry & PBL in all disciplines
5. Embed academic skills & behaviors
6. Nurture partnerships with local businesses & universities to expose students to career & college opportunities after high school
7. Provide career exploration tools

3. The Private Sector, Building STEM Partnerships & Moving Models
Forward
Robert M. Capraro, Mary Margaret Capraro & Michael Muzheve
1. Build relationships before there is a need
2. Determine what a business, K-12 school, workforce commission, postsecondary institution, or local community agency might like from you
3. Understand the outcomes potential partners expect from the partnership
4. All some potential partners want is to be invited & have a discussion

4. Culturally Relevant Project-Based Learning for STEM Education: Implications & Examples in Urban Schools
Jamal Young, Jermaine Young, and Christina Hamilton
1. Culturally relevant pedagogy
2. PBL effective model of instruction with strong influence on student motivation
3. Gradual change from current practices to relevant PBL in STEM education
4. Start with PBLs corresponding to 5-E instructional model
5. Collaboration with professors in STEM education necessary to maintain relationships between higher education & K-12

5. Disrupting Inequality: How Policy Change Can Foster STEM Access for Underserved Students (K-12)
Frieder S. Spiegahagen
1. Look at all existing policies & examine data & resources to make assumptions about the capacity of all students to study Algebra in 8th grade
2. Provide support for teachers & students in gradual transition starting in 5th grade
3. Move forward in progress deliberately & slowly

6. Administrative Support of STEM Culture
Brian Boyd & Matthew Grushon
1. Deciding what qualities your school will focus on is important
2. Lead & listen to discussions with key stakeholders to identify what skills make people successful in life
3. Help teachers develop & share learning targets

Eduardo Mosquera & Saul J. Maldonado
Math instruction in urban schools needs to: 1) include rigorous college-prep courses, 2) serve large proportions of Latinos LMs by making content language of math comprehensible through EL development strategies without compromising access to rigorous content

8. Using Three-Dimensional Virtual Environments to Prepare STEM Teachers
Trina Davis
1. Identification & inclusion of multiple in-world & out-of-world networks
2. Participate in networks, lurk on relevant listservs
3. Volunteer or assist those hosting in-world events with marketing, traffic coordination; make contributions to networks
4. Participate in group builds; design your own network around given topic
5. Create in-world groups on special-interest topics; leverage partnerships among multiple group members promoting opportunities & knowledge development

9. Using Three-Dimensional Virtual Environments to Prepare STEM Teachers
1. Daily & personal access to tools
2. On-going and job embedded PD (Just-in-Time PD)
3. Make sure teachers have a support structure in place, one full-time coach for a campus

10. Gender Equity in STEM: Increasing the Persistence of Females in the STEM K-12 Pipeline
Meredith Jones
1. Examine expectations you have of students & how interactions with students differ by gender
2. Encourage female students to participate in honors or AP STEM courses
3. Provide students with exposure to successful male & female role models in STEM
4. Make connections between what students are learning in class & the real world

11. Geographic Disparities in Science Achievement: The Case of Metropolitan St. Louis
Brittni D. Jones & William F. Tate
1. Prenatal Process: take precaution (especially in regards to cigarette smoking) to prevent low birth weight
2. Birth to age 4: parental interventions support preschoolers’ math learning through daily activities at home
3. Ages 5-13: Pre-HS years: allotting appropriate amount of instructional time for science education in pre-HS years can contribute to efforts to increase opportunity to learn science