

Science education critical for jobs of tomorrow

By Bruce Alberts and Joe Laymon

The challenges facing California's public schools are well-documented, but only recently has the direct effect on the state's economy become clearer. While students in California are progressively less competitive in science, technology, engineering and math (STEM) fields, an increasing percentage of available jobs are technical and require backgrounds in STEM. With so much potential for serious economic harm, the gap between the education students need and the training they receive deserves much closer attention.

WestEd's recently published report "High Hopes — Few Opportunities: The Status of Elementary Science Education in California" finds that although nine in 10 principals say science education is very important and should start early, fewer than half of them think

a student is likely to receive high-quality science instruction in his or her school. This is to be expected, given the lack of time devoted to STEM education in our elementary schools. The report also notes that more than 60 percent of districts have no staff dedicated to elementary science, and more than 75 percent of principals reported that their schools do not have access to a science specialist or coach.

As an example of how this lack of STEM training is affecting one critical sector, the energy industry faces an acute human capital challenge as it works to meet increased global demand. According to the National Petroleum Council, the number of individuals eligible for retirement outpaces the number of people entering the industry. To meet energy demand economically and sustainably, the industry needs workers who have

the technical knowledge, problem-solving capability and creativity that science provides. However, California schools aren't producing enough qualified graduates to fill the high-paid, skilled jobs available in our state.

How can we fill this gap? Schools, teachers and scientists must not only recommit to science education, but also recognize the importance of redefining it. By engaging in scientific discourse at multiple education stages, students will become prepared not just to utilize innovative technologies, but to create and enhance them.

Thus, we must turn our focus from the teaching of scientific facts to involving children in the practice of science, encouraging and enabling them to think and solve problems scientifically. This type of active learning should become a core subject starting early in elementary

school. Students who acquire these problem-solving skills will function most effectively in the workforce and be better able to make wise decisions for themselves, their families and their communities.

The Bay Area Science Festival, hosted by UC San Francisco and sponsored by Chevron, shows what is possible when a hands-on, collaborative approach is taken toward science education. In just 10 days, 70,000 people participated in more than 100 events that inspired them to learn and apply science: working with their hands, solving problems, using tools, thinking logically and working with others. By applying the same energy and enthusiasm to improving science education in California's schools, we can narrow the science gap and prepare more students for the jobs of tomorrow.

This year, Chevron is partnering with the West Contra Costa

Unified School District, Contra Costa Economic Partnership and Contra Costa College Foundation to increase resources for STEM education at different stages leading up to college. While a lack of public resources remains a challenge, we must mobilize the private sector to advance science education in schools. Through partnership, we can leverage complementary assets, expertise and resources to help build a competitive workforce for tomorrow's jobs.

Bruce Alberts is professor emeritus in the department of biochemistry and biophysics at UC San Francisco, editor-in-chief of Science magazine and former president of the National Academy of Sciences. Joe Laymon is vice president of Human Resources, Medical and Security for Chevron Corp. They wrote this for this newspaper.