Graduate With STEM Degree

STEM Major

Non-STEM Major

Proficient (proficient or advanced) 32%

Proficient Interested 17%

Proficient Not Interested 25%

Not Proficient Interested 15%

Not Proficient Not Interested 42%

Not Proficient (basic or below basic) 68%

167,000 Expected in 2011 (1)

278,000 in 2005

1,170,000 Enrolled in 4-year College

2,799,000 Grads in class of 2005

4,013,000 Beginning 9th grade in 2001

Proportion of S&E of first university degrees in 2006

China

USA

Total = 1.5M

Total = 1.7M

47%

16%

S&E Degrees Awarded Per Year (Millions)

1998 2006

0.0 0.5 1.0
“But I think all of you understand it will take far more than the work of government. It will take all of us. It will take all of you. And so today I want to challenge you to use your love and knowledge of science to spark the same sense of wonder and excitement in a new generation.”

-- President Barak Obama, speaking to the National Academy of Science, April 27th, 2009
ISAT composite scores have increased steadily since 2001
ISAT composite scores show CPS is closing the gap with the state...
...yet achievement gaps by race and gender persist.
High school PSAE scores are largely flat...
...and the percent of students scoring 20+ on ACT is essentially flat as well
Instructional Excellence

- High Quality Materials
- Timely Assessment Data
- In-School Supports
- Teacher Capacity
- Research and Evaluation
Instructional Excellence

- High Quality Materials
- Timely Assessment Data
- Teacher Capacity
- Research and Evaluation
- In-School Supports

Supporting Institutions:
- UIC
- DePaul
- Loyola University Chicago
- Illinois Institute of Technology
- The University of Chicago
- Roosevelt University
Rapid scale up to 500 K-8 schools and 100 high schools.
For K-8 mathematics, implementing schools improve faster.
For HS reading, mathematics, and science, implementing schools improve faster.
Relationship between CMSI Professional Development Attendance and Student 2005 ISAT Performance

1-year change in the percent of students meeting/exceeding state standards:

- **3rd Grade**:
  - Low: -2.0
  - Moderate: 0.4
  - High: 1.8

- **5th Grade**:
  - Low: 0.1
  - Moderate: 0.1
  - High: 3.5

- **8th Grade**:
  - Low: 1.5
  - Moderate: -0.2
  - High: -3.3
STEM education reform is part of education reform.
Raise standards and improve assessments.

Recruit, retain & support effective educators, and ensure equitable distribution.

Build robust data systems that track student progress and improve practice.

Turn around low-performing schools, focusing on dropout factories and their feeder schools.
Schools and the Stimulus

COMMENTARY

STEM Education: A Race to the Top

By Edward E. Kaufman

In a recent speech, former President Bill Clinton compared the United States today to the European Union in the 1990s. During that period, he said, many EU countries were creating "a slew of new jobs in energy." Notably ahead of the green-revolution curve, they now have the strong, growing employment in green jobs we hope to launch with new initiatives and much innovation.

If America is to rebuild its economy, it must develop new opportunities with room for growth.

This means creating green jobs to produce safe water, clean, renewable energy, and other vital environmental amenities. It's a necessary ingredient of high-quality education.
The nature of STEM demands specializes strategies.
## Subject Matter & Leaders’ Mental Scripts

<table>
<thead>
<tr>
<th>Subject-Matter Views</th>
<th>Literacy (%)</th>
<th>Math (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Core to curriculum</td>
<td>80</td>
<td>83</td>
</tr>
<tr>
<td>Skills support learning in other subjects</td>
<td>83</td>
<td>17</td>
</tr>
<tr>
<td>Skills should be taught in a particular sequence</td>
<td>16</td>
<td>53</td>
</tr>
<tr>
<td>School has primary expertise</td>
<td>80</td>
<td>13</td>
</tr>
<tr>
<td>External community has primary expertise</td>
<td>2</td>
<td>63</td>
</tr>
</tbody>
</table>
Knowledge/Advice Networks

Language Arts Network

Mathematics Network

- Green nodes: teachers
- Gray nodes: principal/assistant principal
- Red nodes: specialists
- Blue nodes: teacher leaders
Lesson Quality is Associated with Adherence to District-Designated Materials

<table>
<thead>
<tr>
<th>Percent of Lessons Receiving High Ratings</th>
<th>Low</th>
<th>Medium</th>
<th>High</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>11</td>
<td>46</td>
<td>55</td>
</tr>
</tbody>
</table>
Motivation and Inspiration and Matter
ROCK STARS SCIENCE

Being a rock star is about the same amps, thunder, and art. It’s always been, but these days a rock star can be anyone whose genius moves the crowd—whether they’re onstage or in the lab.

The musicians you know—they’re icons. As for the other guys, they’re the doctors whose work has brought us closer to a cure for Cancer, HIV/AIDS, and Alzheimer’s disease. These fellows won’t be your usual tripe like Sheryl Crow, but they’re lighting up the future with something just as powerful: hope.
When a chance peek over 11-year-old Taylor’s shoulder revealed a biology worksheet, she realized a teacher she’d trusted had been secretly teaching her only son about the physical world and its mechanics for almost a year.

“They Tried To Teach My Baby Science”

By Rick Cantrell

Inside: Five Valuable Lessons In Humility I Opt To Ignore – By Donald Trump
“Despite forceful calls from business leaders and policymakers to upgrade math and science education, most superintendents (59%) and principals (66%) say this is not a serious problem in their local schools.”
“Aligned To Standards”
School Leaders ≠ Mathematics Leaders
michael.lach@ed.gov