Educating a Global Student

Next Generation Science Standards (NGSS)

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SDSU Educational Leadership Symposium
Next Generation Science Standards: 次代科學標準 NGSS
Why Change the Way We Teach Science? 爲什麼我們改變教科學的方法

- College and workforce readiness
- Globalization

STEM = 科學+科技+工程+數學的縮寫
STEM in California 加州的STEM教育

• California will demand a total of 1.1 million STEM jobs by 2018

• 93% of these jobs will require postsecondary education and training.

Georgetown University Center on Education & the Workforce
Common Core, NGSS, and Linked Learning have the same goal:

- Prepare a globally literate student population that is ready to compete in college and career.
NGSS and Linked Learning

• What is Linked Learning? 什麼是連貫學習方法?

It is an approach to high school transformation with the specific goal of preparing ALL students for both college and career.
Future Healthcare Professional 將來從事醫療保健的人才
The NGSS Biology Curriculum NGSS 生物學習大綱

There are five NGSS life science topics:

1) Structure and Function

2) Inheritance and Variation of Traits, Matter and Energy in Organisms and Ecosystems

4) Interdependent Relationships in Ecosystems

5) Natural Selection and Evolution.
Linked Learning: Four Core Components 連貫學習的四中心部分

- Academic core
  - NGSS
- Technical core
- Work-based learning
- Student support
Linked Learning: Making a Difference for Students
連貫學習：為學生創造了不同

What does the research tell us about student outcomes?

• Greater student engagement
• Lower high school drop-out rates
• Higher graduation rates
• Higher G.P.A.
• Higher CAHSEE pass rates for Latino and low income students
• Substantial earnings benefits
• Higher transition rates to college
Relationships and Convergences

found in the Common Core State Standards in Mathematics (practices), Common Core State Standards in ELA/Literacy (student portraits), and the Next Generation Science Standards (science & engineering practices).

These student practices and portraits are grouped in a Venn diagram. The letter and number set preceding each phrase denotes the discipline and number designated by the content standards in ELA/Literacy, Mathematics, and Science.

Sources:


Common Core State Standards for Mathematical Practice p.6-8.

Transforming Science Instruction with the Linked Learning Approach

San Ysidro High School Health Career Pathway, San Diego County

Comparison of CST Biology Mean Scores

<table>
<thead>
<tr>
<th>Course</th>
<th>2009-10</th>
<th>2010-11</th>
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</thead>
<tbody>
<tr>
<td>San Ysidro Traditional Biology</td>
<td>324.9</td>
<td>347.1</td>
</tr>
<tr>
<td>State of California Biology</td>
<td>349.3</td>
<td>364.9</td>
</tr>
<tr>
<td>Sweetwater Union High School District Biology</td>
<td>353.8</td>
<td>386.6</td>
</tr>
<tr>
<td>San Diego County Biology</td>
<td></td>
<td></td>
</tr>
<tr>
<td>San Ysidro Biology – Medicine &amp; Health</td>
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<tr>
<td>San Ysidro Biotechnology*</td>
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</tbody>
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*No overlapping students with Biology – Medicine & Health. 92.5% of SYHS Biotechnology students in 2010-11 were in 10th grade, 7.5% in 11th grade.

Year-Over-Year CST Biology Mean Comparisons

<table>
<thead>
<tr>
<th>SYHS Biology – Medicine &amp; Health</th>
<th>2009-10 (n=58)</th>
<th>2010-11 (n=38)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009-10</td>
<td>352.9</td>
<td>364.9</td>
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</table>

This course was offered at the college-preparatory level, without honors status.

SYHS Biology – Medicine & Health

The boy and girl students are divided into separate classrooms for this course.

Boys (n=15):
100% 9th grade
60% scored at the Advanced and Proficient levels
An additional 27% scored at the Basic level
Community Activism 社區義工
Making Connections 聯誼
Future Scientists 未來科學家