PACE/California Diploma Project

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Project Goals and Overview

- Provide timely, relevant, and useful information to state policymakers about the relationships between state-level expectations across high school and college in Health and related implications.

- Determine relationships re: English and mathematics knowledge, skills, and cognitive strategies between college entry and CCSS, and between CTE standards in Heath and CCSS.

- Provide support for the CDE's work to revise CTE standards and align with the CCSS.

- Include exploratory field research to learn about students' experiences in Health in high school and community college.

Structure of Today's Seminar

- Overview and goals of project

- Findings from ICAS/CCSS crosswalk

- CDE's CTE standards revision process

- Findings from CTE (Health Science and Medical Technology)/CCSS alignment study

- Initial impressions from student focus groups

- Discussion

Project Components

- Crosswalk between ICAS and CCSS

- Alignment between CTE Standards (Health) and CCSS

- Validity study

- Student focus groups

Part I: Crosswalk

ICAS Statements of Competencies and Common Core State Standards

I. Crosswalk
◆ Exploratory study comparing ICAS Statements of Competencies and Common Core State Standards
◆ December 2011 - March 2012
◆ Preliminary report and results drafted

Part II and III: Alignment and Validity

Health Sciences and Medical Technology CTE Standards

II. Alignment	III. Validity
● Health Sciences and subject area experts analyze the relationship between the new draft Health Sciences Standards and the Common Core State Standards for:	● Faculty and industry experts will rate each of the Health Sciences standards for:
◆ Content Alignment: Match, Partial Match (with rationales), and No Match	◆ Applicability: Prerequisite, Reviewed, Introduced, Subsequent, or Not Applicable
◆ Cognitive Complexity: 4-point scale of Depth of Knowledge	◆ Importance: 4-point scale from least to most
● March 2012 – May 2012	● May 2012 - August 2012

Crosswalk Results

The following slides outline the methodology and results of the relationship between the ICAS Statements of Competencies and the Common Core State Standards

Methodology

About the Crosswalk

- A crosswalk is a means to examine relationships by arraying two sets of learning expectations orthogonally in a matrix format and then examining the intersection of each element of each statement in a unique cell.

- The relationship represented by that cell is then coded based on a categorization system designed to produce insight into how two sets of statements interact with one another.

Learning Expectations Analyzed

- Intersegmental Committee of the Academic Senates (ICAS) Statements of Competencies for Mathematics and Academic Literacy.

- Common Core State Standards (CCSS) in English Language Arts and Literacy (ELA) and mathematics.

Crosswalk Codes

A five point scale was used to rate each intersection on the crosswalk matrix.

Code	Description
ACR	Aligned Content Relationship
PACR	Partially Aligned Content Relationship
PCR	Prerequisite Content Relationship
CTLR	Consistent Teaching/Learning Relationship
ITLR	Inconsistent Teaching/Learning Relationship

ELA Results

The following slides outline the broad results of the relationship between the ICAS competencies and the Common Core State Standards Anchor Standards

Overview of All Intersections

ICAS Competencies	ACR	PACR	PCR	CTLR	ITLR
Habits of Mind	0.1%	6.0%	7.3%	10.1%	76.5%
Reading/Writing Connection	0.7%	13.9%	22.6%	4.2%	58.7%
Reading	1.0%	15.7%	14.0%	2.1%	67.1%
Writing	0.6%	7.9%	0.1%	11.3%	80.0%
Listening and Speaking	0.0%	4.1%	0.0%	2.5%	93.4%
Listening and Speaking for ESL Students	0.0%	0.0%	0.0%	3.1%	96.9%
Technology	0.2%	3.1%	0.0%	6.9%	89.8%

Percent of ELA ICAS Competencies with Relationship to CCSS

- Of the 131 ICAS competencies, 120 had at least one match to an English Language Arts Anchor Standard in one of the first four categories

■ Percent with at least one match that signifies relationship

■ Received only ITLR

8%

92%

12
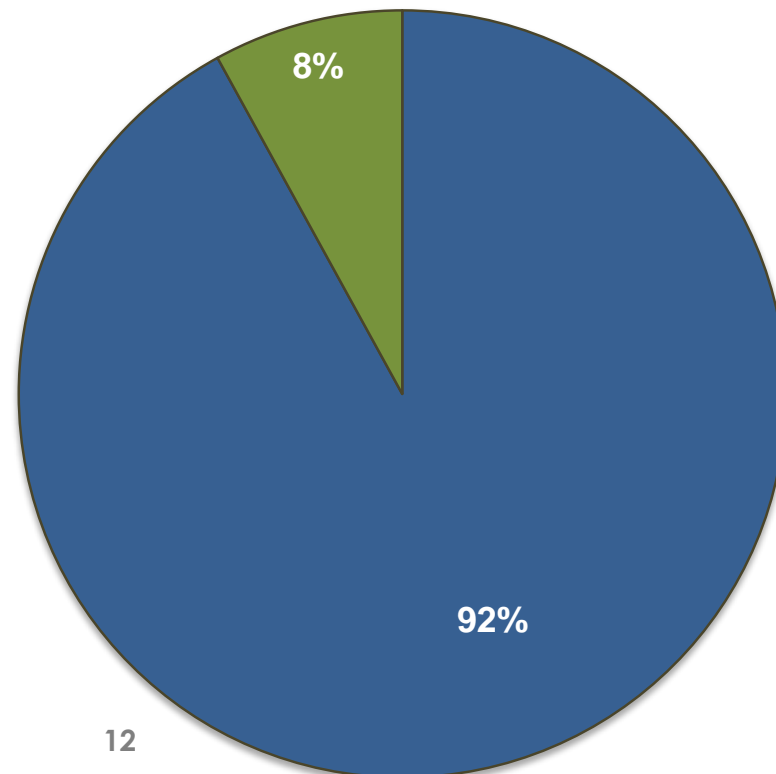
Distribution of Matches (ACR, PACR, PCR, CLTR)
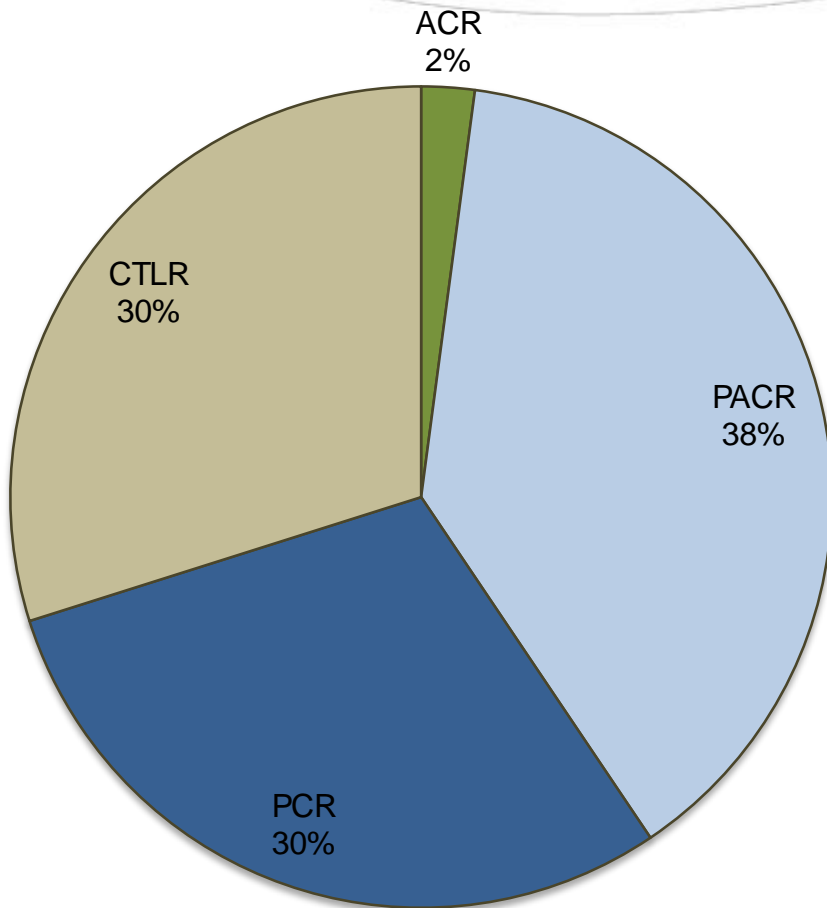
- 4192 total intersections evaluated

- 908 were coded as ACR, PACR, PCR, or CTLR

- The chart to the left illustrates the distribution of the 908 with a relationship to the CCSS

ELA ICAS Competencies (ITLR)

The competencies to the right had no significant relationship to the CCSS

- Habits of Mind: interrogate own beliefs
- Habits of Mind: meet deadlines for assignments
- Habits of Mind: demonstrate initiative and develop ownership of their education
- Habits of Mind: gain attention appropriately
- Habits of Mind: be attentive in class
- Habits of Mind: exercise civility
- Habits of Mind: engage in self-advocacy
- Reading: have patience
- Writing: reasons, and logic
- Listening and Speaking for ESL students: identify nuances of meaning indicated by shifts in vocal inflection and non-verbal cues, such as facial expressions or body language
- Listening and Speaking for ESL students: demonstrate a full range of pronunciation skills including phonemic control mastery of stress and intonation patterns of English.

Percent by Category with no Relationship to CCSS

Academic Literacy Competency Areas	Number of competencies in section	Number of competencies with no significant relationship with CCSS	Percent of ICAS competencies with no significant relationship to the CCSS
Habits of Mind	27	7	25.9%
Reading/Writing Connection	9	0	0.0%
Reading	31	1	3.2%
Writing	26	1	3.8%
Listening and Speaking	15	0	0.0%
Listening and Speaking for ESL Students	4	2	50.0%
Technology	19	0	0.0%

Mathematics Results

The following slides outline the broad results of the relationship between the ICAS competencies and the Common Core State Standards High School Clusters and Mathematical Practices

Math Overview

ICAS Competencies by Area	ACR	PACR	PCR	CTLR	ITLR
Approaches to Mathematics	1.2%	1.8%	6.2%	2.4%	88.5%
Aspects of Instruction	0.2%	4.8%	5.4%	1.2%	88.5%
Subject Matter Essential for All Students	0.0%	7.1%	4.8%	0.0%	88.1%
Subject Matter Desirable for All Students	0.0%	2.8%	0.8%	0.0%	96.4%
Subject Matter Essential for Quantitative Majors	0.0%	8.3%	2.0%	0.0%	89.7%
Subject Matter Desirable for Quantitative Majors	0.0%	1.9%	1.3%	0.0%	96.8%
Mathematical Skills	0.0%	0.0%	1.7%	1.1%	97.2%

Percent of Math ICAS Competencies with Relationship to CCSS

- Of the 47 ICAS competencies, 46 had at least one match to mathematics cluster or math practice in one of the first four categories

■ Percent with at least one match that signifies relationship

■ Received only ITLR

2%

98%
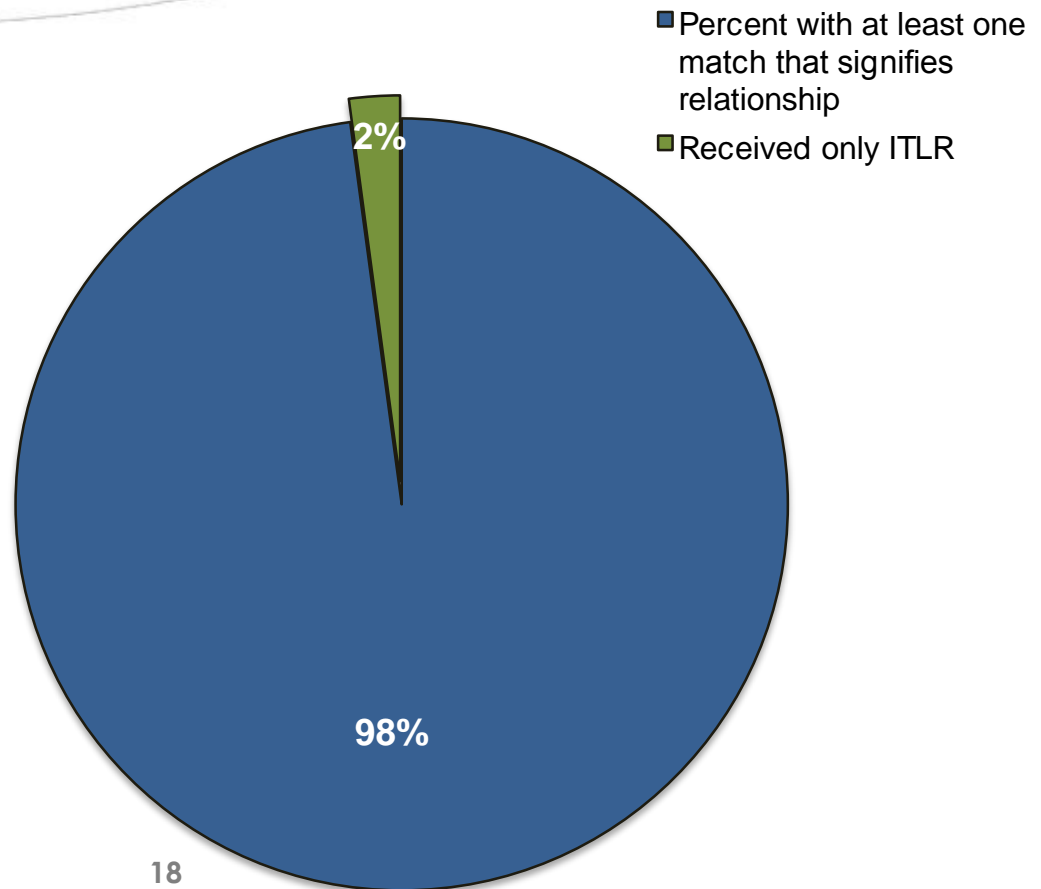
Distribution of Matches (ACR, PACR, PCR, CLTR)
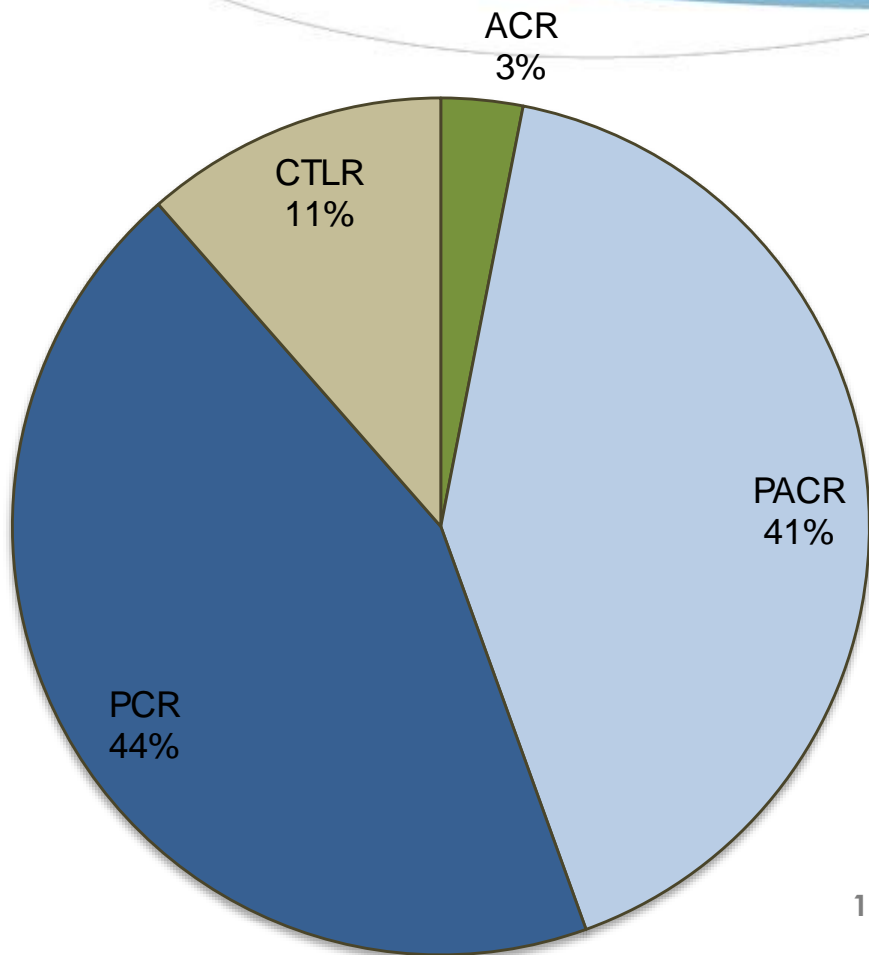
- 2961 total intersections evaluated

- 227 were coded as ACR, PACR, PCR, or CTLR

- The chart to the left illustrates the distribution of the 227 with a relationship to the CCSS

ACR 3%
CTLR 11%
PACR 41%
PCR 44%

Math ICAS Competencies (ITLR)

The competency to the right had no significant relationship to the CCSS

- Subject Matter Desirable for all Students - Discrete Mathematics: Topics such as set theory, graph theory, coding theory, voting systems, game theory, and decision theory.

Percent with no Relationship to CCSS

Mathematics Competency Areas	Number of competencies in area	Number of competencies with no significant relationship with CCSS	Percent of ICAS competencies with no significant relationship to the CCSS
Approaches to Mathematics	8	0	0.0%
Aspects of Instruction	8	0	0.0%
Subject Matter Essential for All Students	6	0	0.0%
Subject Matter Desirable for All Students	4	1	25.0%
Subject Matter Essential for Quantitative Majors	4	0	0.0%
Subject Matter Desirable for Quantitative Majors	5	0	0.0%
Mathematical Skills	12	0	0.0%

Overall Findings

Do all ICAS competencies relate to the CCSS?

ELA

✓ Overall, yes, 92% of the time the ICAS are present in some way when the CCSS are taught or learned
  - ✓ CCSS are missing certain "Habits of Mind"
  - ✓ CCSS do not address English as a second language sufficiently

Math

✓ Overall, yes, 98% of the time the ICAS are present in some way when the CCSS are taught or learned
  - ✓ For areas that are essential for all majors, yes, but completely missing some content that is desirable for all students, such as Discrete Mathematics

Overall Findings (cont.)

Do all CCSS relate to the ICAS competencies?

- ✓ The relationship indicates that when the ICAS standards are taught and learned the CCSS will be addressed *in some way* in ELA and in a majority of instances *in some way* in mathematics.
- ✓ Three CCSS cluster level standards have no matches to an ICAS competency:
  - Functions: Model periodic phenomena with trigonometric functions
  - Geometry: Visualize relationships between two-dimensional and three-dimensional objects
  - Statistics and Probability: Interpret linear models

Considerations and Further Analysis

✓ This scale captures content relationships including alignment, prerequisite, and teaching and learning. It does not, however, unpack those relationships through further specification or rigor.

✓ Examine the ICAS competencies that only have one match with the CCSS and that are rated as partial, prerequisite, or consistent teaching/learning relationship.

- For example, the ICAS competency for Calculus is addressed by only one CCSS cluster as a prerequisite relationship, we would not want to mislead people to think that we are saying that Calculus is completely covered by the CCSS with our preliminary results data.

CTE Model Curriculum Standards Update

Goal: Update the Career Technical Education Model Curriculum Standards to reflect current business and industry practices and align with the recently adopted Common Core State Standards for English language arts and mathematics and the Next Generation Science Practices and Core Ideas

CTE Model Curriculum Standards Update

CTE Standards Design Criteria:

- Fewer, clearer, higher
- Aligned to current business & industry practices
- Aligned with postsecondary entry requirements (within a career focus)
- Lead to a certificate, license or degree
- Meet 21st Century skills & knowledge
- Research-based and measurable
- Enhance, expand or apply CCSS (where practical)

CTE Model Curriculum Standards Update

Process:

- Form review teams for each of the 15 Industry Sectors comprised of business/industry and postsecondary representatives

- Solicit recommendations for CTE Model Curriculum Foundation and Pathways Standards revisions

- Revise MCS Anchor (Foundation) Standards and Performance Indicators

- Identify or revise pathways by title and content
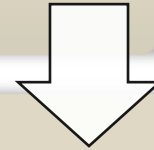
CTE Model Curriculum Standards & Framework

Process (continued)

- Develop standards language for 15 Industry Sector pathways and performance indicators

- Identify Common Core State Standards for English language arts and math, Next Generation Science practices and core ideas, and social studies standards aligned to Industry Sector pathway standards and performance indicators

- Submit draft MCS for review and approval

- Update Framework to reflect MCS revisions

- Build a professional development program
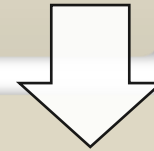
MCS Learning Continuum (new)

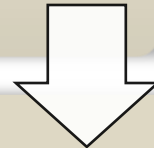**CTE Core Practices**

(Knowledge and skills for all students)

CTE Anchor Standards

(Common in title, written in context)

Industry Sector Pathway Standards

(Content specific to pathway expectations)

Career Specialty

(Capstone: certification, licensure, degree)

CTE Model Curriculum Standards Update

Anchor Standards:

1. ACADEMICS
2. COMMUNICATIONS
3. CAREER PLANNING & MANAGEMENT
4. TECHNOLOGY
5. PROBLEM SOLVING & CRITICAL THINKING
6. HEALTH & SAFETY
7. RESPONSIBILITY & FLEXIBILITY
8. ETHICS & LEGAL RESPONSIBILITIES
9. LEADERSHIP & TEAMWORK
10. TECHNICAL KNOWLEDGE & SKILLS
11. DEMONSTRATION & APPLICATION

CTE Model Curriculum Standards Update

Foundation Standard	ELA Common Core Standard	CTE Anchor Standard
2.0 Communications Students understand the principles of effective oral, written, and multimedia communications.	**Listening & Speaking** Acquire & use accurately general academic & domain-specific words & phrases, sufficient for reading, writing, speaking, and listening at the career & college readiness level (LS 11-12.6)	**2.0 Communications** Acquire & use accurately industry sector terminology & protocols for communicating effectively in oral, written, and multimedia formats. (deliberate alignment)

CTE Model Curriculum Standards and Framework

Industry Sectors:

1. Agriculture & Natural Resources
2. Arts, Media & Entertainment
3. Building Trades & Construction
4. Business & Finance
5. Education, Child Development & Family Services
6. Engineering
7. Energy & Utilities
8. Fashion & Interior Design

9. **Health Science & Medical Technology**
10. Hospitality & Tourism
11. Information & Communication Technologies
12. Manufacturing & Product Development
13. Marketing Sales & Service
14. Public Services
15. Transportation

Preliminary Alignment Results

The following slides outline the methodology and some preliminary results of the alignment between the Health Sciences Standards and the CCSS

Methodology

About the Alignment Methodology

- Examines two dimensions of alignment: content alignment and cognitive complexity.

- More rigorous methodology than crosswalk

Research Questions

- To what extent are the knowledge and skills found in the CA CTE Health Science Standards the same or different (aligned) to the Common Core State Standards?

- What is the distribution of the cognitive complexity for both sets of standards across the four levels of a depth of knowledge scale?

Standards

CA Common Core State Standards

English Language Arts and Literacy (grade 11-12)
- Speaking and Listening
- Language
- Reading for Science and Technical Subjects
- Writing for History/Social Studies, Science, and Technical Subjects

Mathematics (High School)
- Math Practices
- Number and Quantity
- Algebra
- Functions
- Geometry
- Statistics and Probability
- AP Probability and Statistics
- Calculus

CA Health Sciences CTE Standards

- Biotechnology
- Patient Care Pathway
- Healthcare Administrative Services
- Healthcare Operational Support Services
- Public and Community Health
- Mental and Behavioral Health

Alignment Process

1. Depth-of-Knowledge

♦ Content experts with expertise in ELA, mathematics, and health sciences work individually and then as a group to assign Depth of Knowledge levels (cognitive complexity) to each standard

2. Alignment/Match

♦ Content experts then work individually and then as a group to systematically read each Health standard and evaluate for content matches from the Common Core and make a determination about whether the matched standards represent complete alignment, partial alignment, or no alignment (partial matches are also given a rationale statement)

Step 1: Depth of Knowledge Levels

1	Recall	Recall of fact, information, or procedure
2	Skill/Concept	Use information or conceptual knowledge, two or more steps, etc.
3	Strategic Thinking	Requires reasoning, developing plan or a sequence of steps, some complexity, more than one possible answer.
4	Extended Thinking	Requires an investigation, time to think and process multiple conditions of the problem

Step 2: Alignment Relationship Codes

| Code	Definition
Complete Alignment	All content in the Common Core State Standard(s) fully align with the Health Sciences Standard
Partial Alignment	Some of the content in a standard from one set of standards relates to some or all of the content in another standard from the comparison set of standards.
No Alignment	None of the content in the CCSS aligns with any of the content in the Health Sciences Standard

Rationale Statements for Partial Alignment Matches
Health Science Standard content is prerequisite to the CCSS
CCSS content is prerequisite to the Health Science Standard
Part of the Health Science Standard Matches All of the CCSS
Part of the CCSS matches all of the Health Science Standard
Part of the Health Science Standard matches part of the CCSS

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Biotechnology Pathway Early Results

The following slides outline the broad results of the relationship between the Biotechnology Pathway and the 1) ELA and Literacy Common Core State Standards, and 2) High School Mathematics Standards and Math Practices
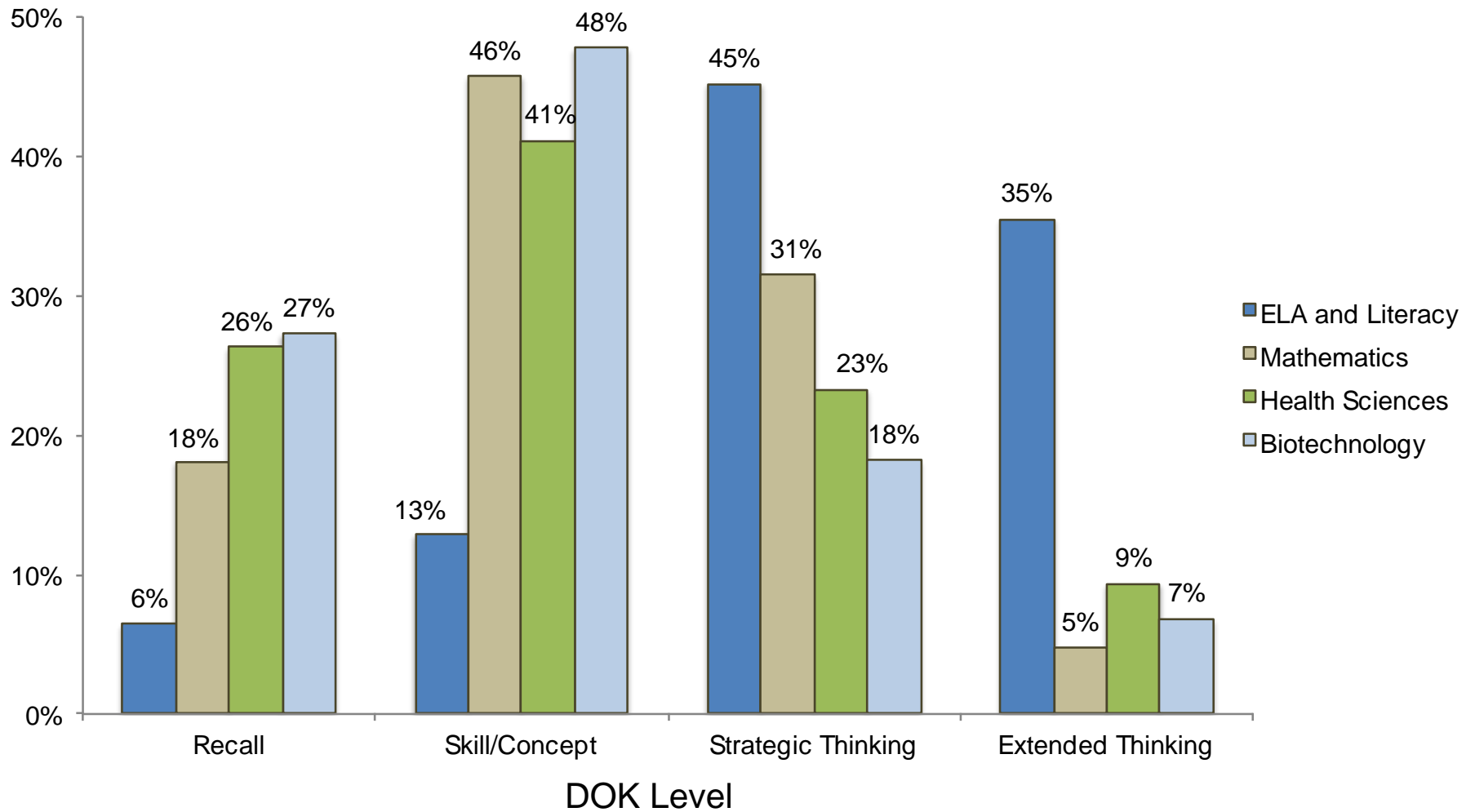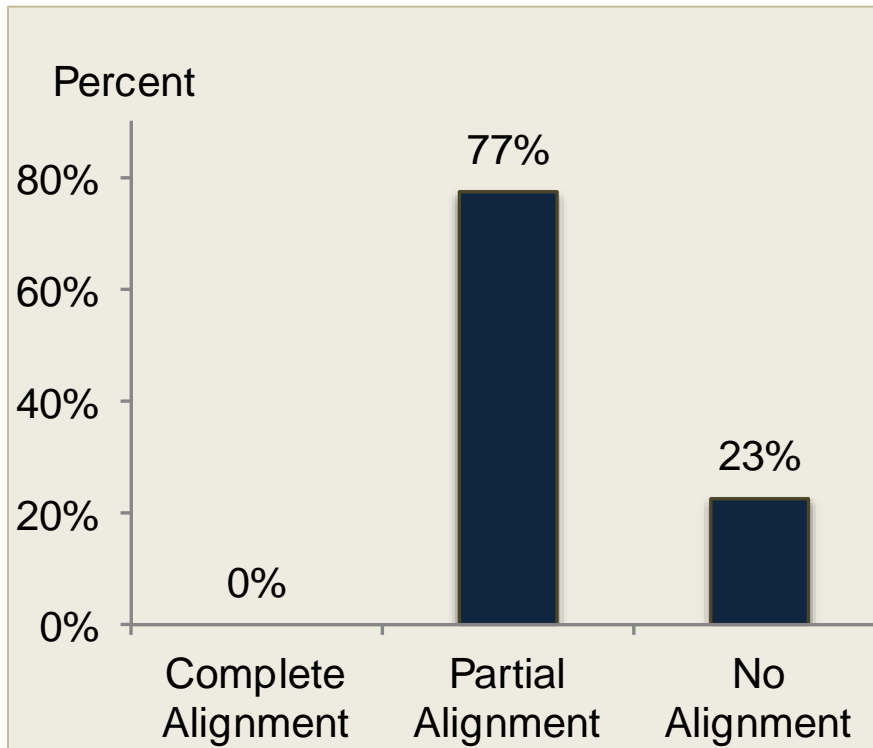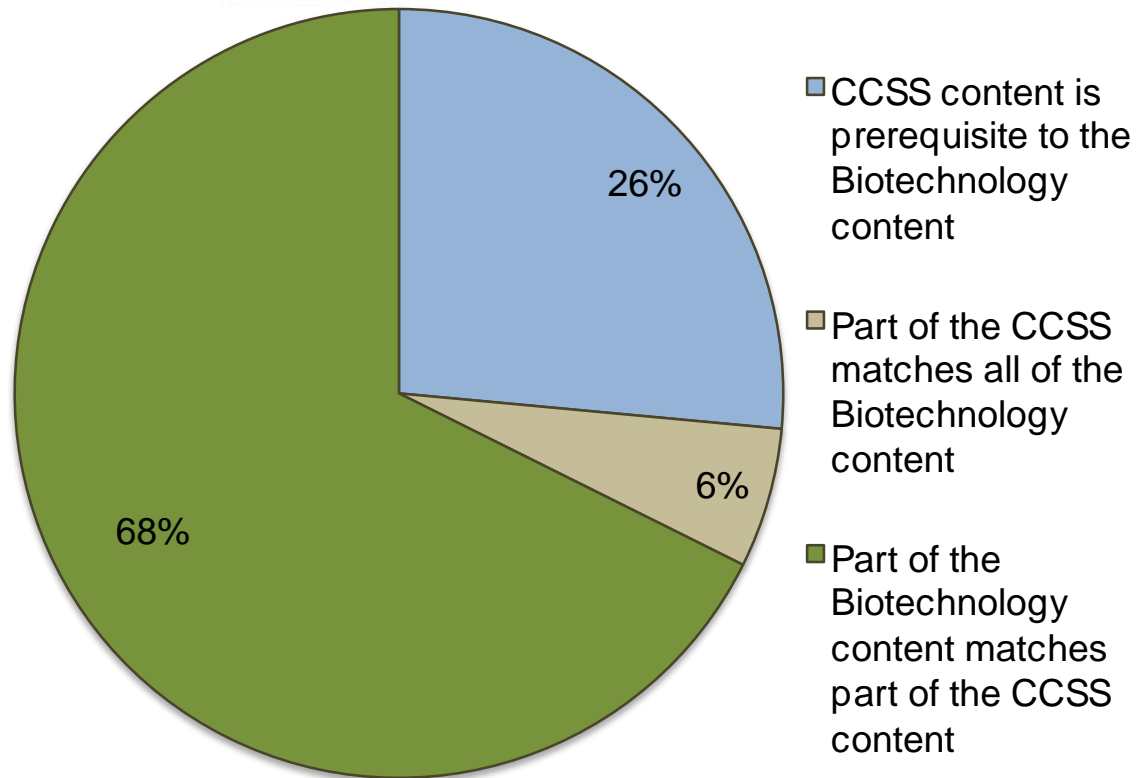
DOK Overview
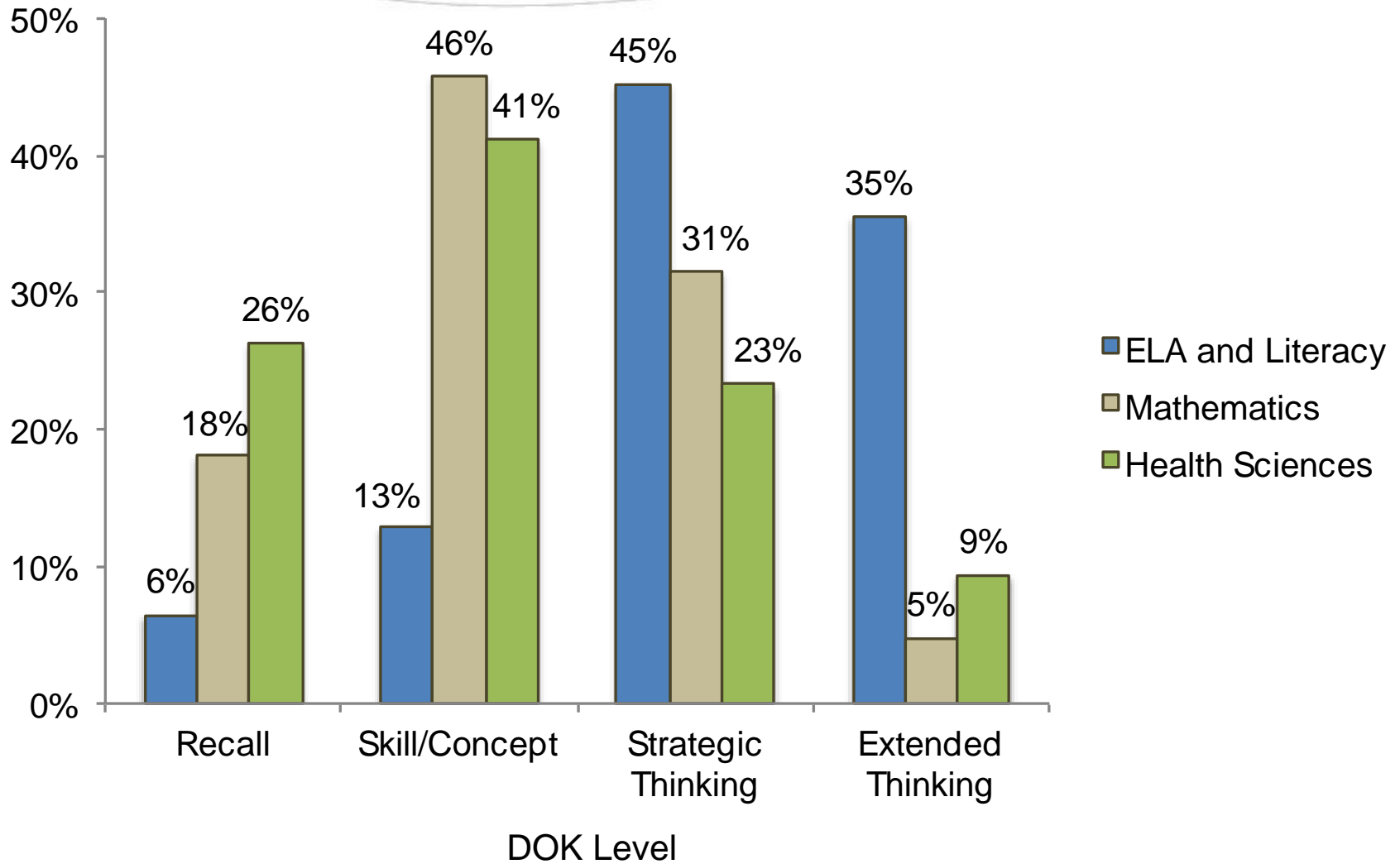
DOK Biotechnology

Biotechnology Pathway and CCSS ELA and Literacy Alignment

Percent

- ⬥ No rated Biotechnology statement had a Complete Alignment relationship with a CCSS.

- ⬥ Of the 44 Biotechnology rated statements, 34 or 77% were rated as having a partial match relationship with the matched CCSS for ELA and Literacy

- ⬥ 23% or 10 statements were had no matched ELA standards

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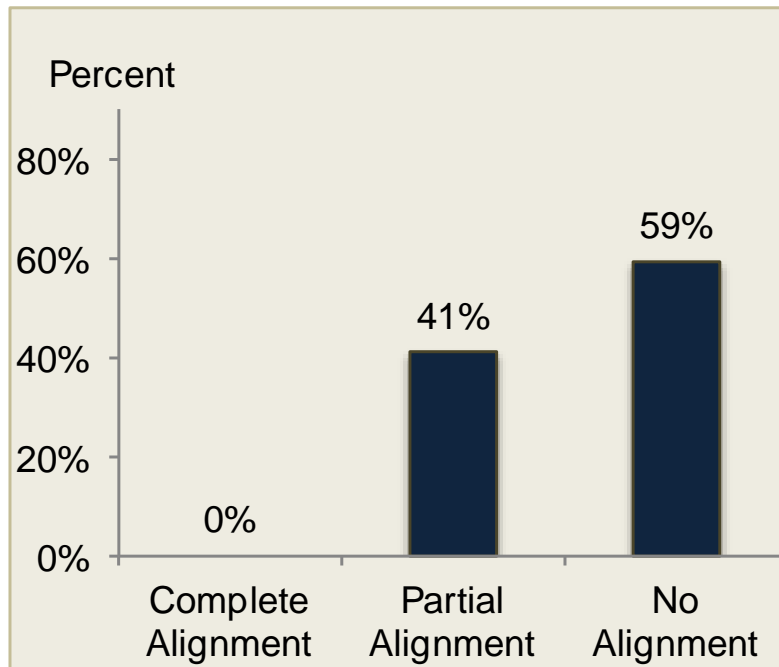# Biotechnology Rationale Statements for Partial Alignment- ELA

- 26% — CCSS content is prerequisite to the Biotechnology content
- 6% — Part of the CCSS matches all of the Biotechnology content
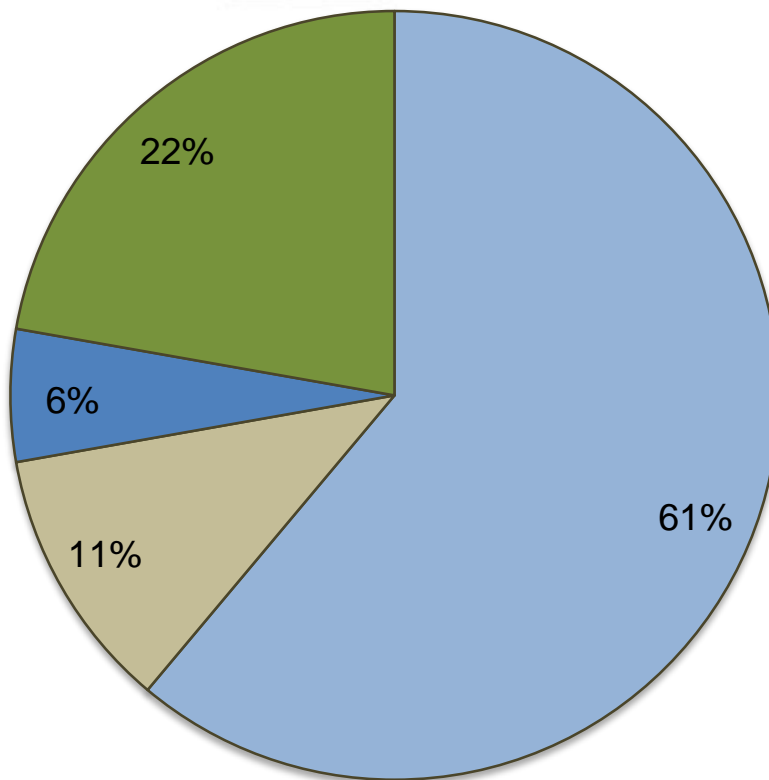- 68% — Part of the Biotechnology content matches part of the CCSS content

Example of Matched ELA Standard

Biotechnology Standard	DOK Level	English Language Arts and Literacy Common Core Standard	Alignment Relationship	Rationale
A8.0. Understand that manufacturing represents inter-connectedness between science and production. A8.6 Use the Internet to find information about, traditional pharmaceuticals, herbal remedies and recombinant pharmaceuticals.	2	WHST6. Use technology, including the Internet, to produce, publish, and update individual or shared writing products in response to ongoing feedback, including new arguments or information. (DOK Level 4) WHST7. Conduct short as well as more sustained research projects to answer a question (including a self generated question) or solve a problem; narrow or broaden the inquiry when appropriate; synthesize multiple sources on the subject, demonstrating understanding of the subject under investigation. (DOK Level 4)	Partial Match	Part of the Health CTE matches part of the CCSS

Biotechnology Pathway and CCSS Mathematics Alignment

Percent

Bar chart showing: Complete Alignment 0%, Partial Alignment 41%, No Alignment 59%.

- No rated Biotechnology statements had a Complete Alignment relationship.

- Of the 44 Biotechnology rated statements, 18 or 41% were rated as having a partial match relationship with the matched CCSS mathematics standards

- 59% or 26 statements were had no matched mathematics standards

Biotechnology Rationale Statements for Partial Alignment - Math

Legend:
- CCSS content is prerequisite to the Health CTE
- Part of the CCSS matches all of the Health CTE
- Part of the Health CTE matches all of the CCSS
- Part of the Health CTE matches part of the CCSS

Values: 61%, 22%, 11%, 6%

Example of Matched Math Standard

Biotechnology Standard	DOK Level	Mathematics Common Core State Standard or Math Practice	Alignment Relationship	Rationale
A7.0 Follow sustainable and safe practices with high regard for quality control. A7.6 Determine which equipment is appropriate to use for a given task and what units of measurement are used.	1	MP.5 Use appropriate tools strategically. (DOK Level 3)	Partial Match	Part of the Health CTE matches part of the CCSS

Student Focus Groups

- Exploratory

- Conducted on March 30, 2012 at the California Health Occupations Students of America (Cal-HOSA) conference

- Four high school focus groups (N = 40; juniors and seniors) and two community college focus groups (N = 17).

- Initial impressions

General Impressions: Overall

- There was variation across h.s. pathways/academies in terms of level of math, amount of specific health info, depth of advising, opportunities to connect with colleges, work-based learning opportunities, etc.

- Focus in h.s. is on getting into college, not on college success.

- Need stronger advising in h.s. and college about specific health opportunities and college in general.

- More optimism expressed in h.s. groups.

- Sense of fending for oneself once in college.

General Impressions: H.S.

- Health pathways in h.s. provides students with fall-back career and way to earn money in college.

- Work-based learning is positive, and a big time commitment.

- Optimistic about college preparation.

- Many had connected in some way with a college (such as concurrent enrollment).

- Strong interest in matriculating directly into college.

- Clear sense of which college they wish to attend.

- Felt supported in pathway/academy.

- Value of rotating/experimenting within Health.

- Few had a clear sense of math knowledge/skills needed to prepare for college.

General Impressions: College

- General feeling of lack of preparation for college (8 out of 9 in one group, 4 out of 8 in other).

- Surprises in college: less writing (shorter papers), harder to earn good grades, very self-directed, not enough advising, noticeable impact of budget cuts, wanted more prep in nonacademic areas.

- Wanted more specific information about health options and careers while in h.s.

Student Quotes

Next Steps

Timeline

Complete Remaining Pathways for Alignment

April 2012

Analyze Alignment Results

May 2012

Recruit Validity Participants

May –July 2012

Conduct Validity Survey

July-August 2012

Analyze Validity Results

September 2012

Final product(s)

October 2012

Discussion