



Perspectives on AP Redesign for Enrollment Managers

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Agenda

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*II. What We're Changing
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*III. Overview of
AP Biology Revisions*

*IV. Impacts of AP Redesign
on Higher Education*



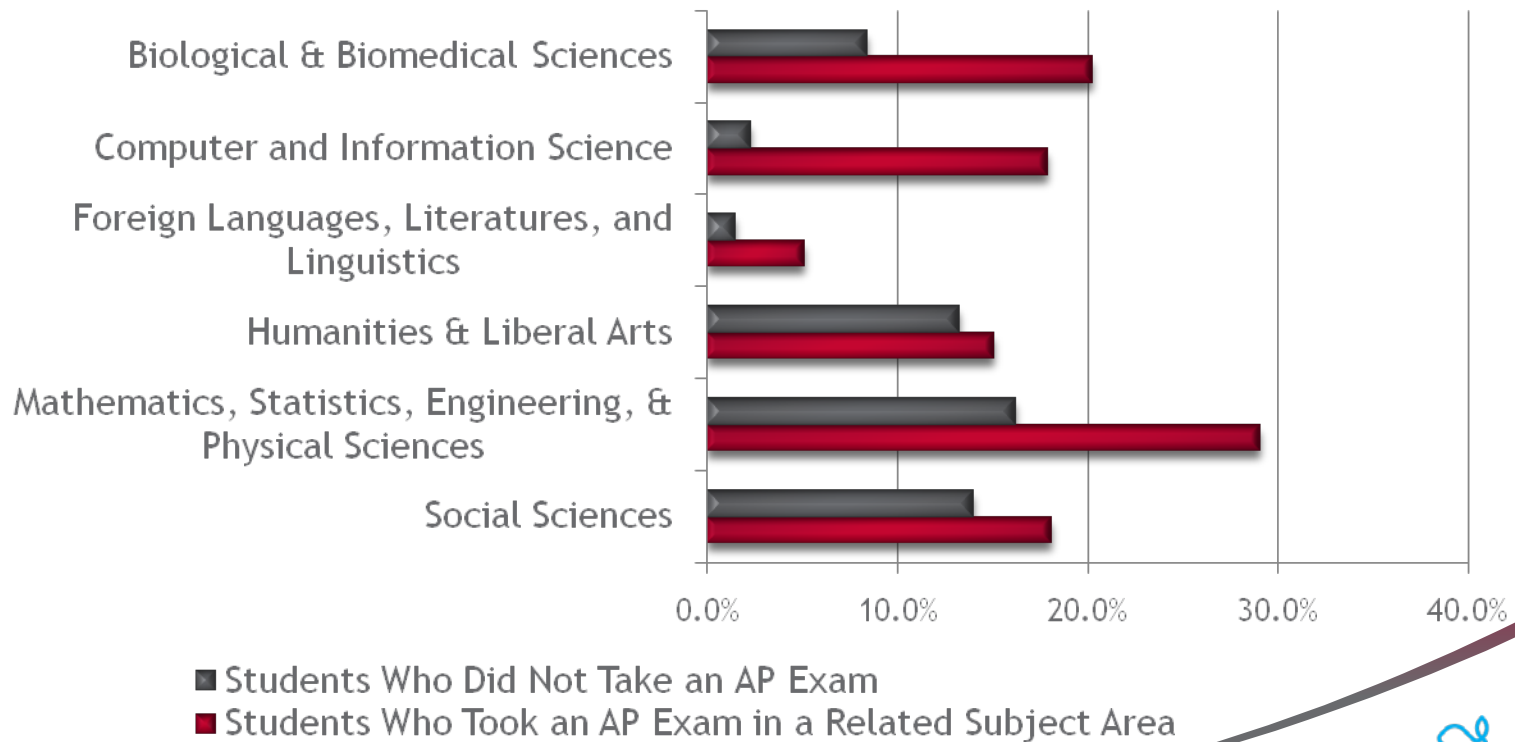
What is the value of AP?

- AP courses and exams help colleges to identify students who have the knowledge, skills and academic behaviors for success in college.
- AP scores can be used to appropriately place students in courses that engage and challenge them.
- AP students who do well on AP Exams are more likely to succeed in sequent college course work and to graduate in four or five years.

AP students tend to major in disciplines related to their AP Exam

The correlation between AP Exam and major is particularly strong for STEM subjects.

College Majors—AP Students and Non-AP Students



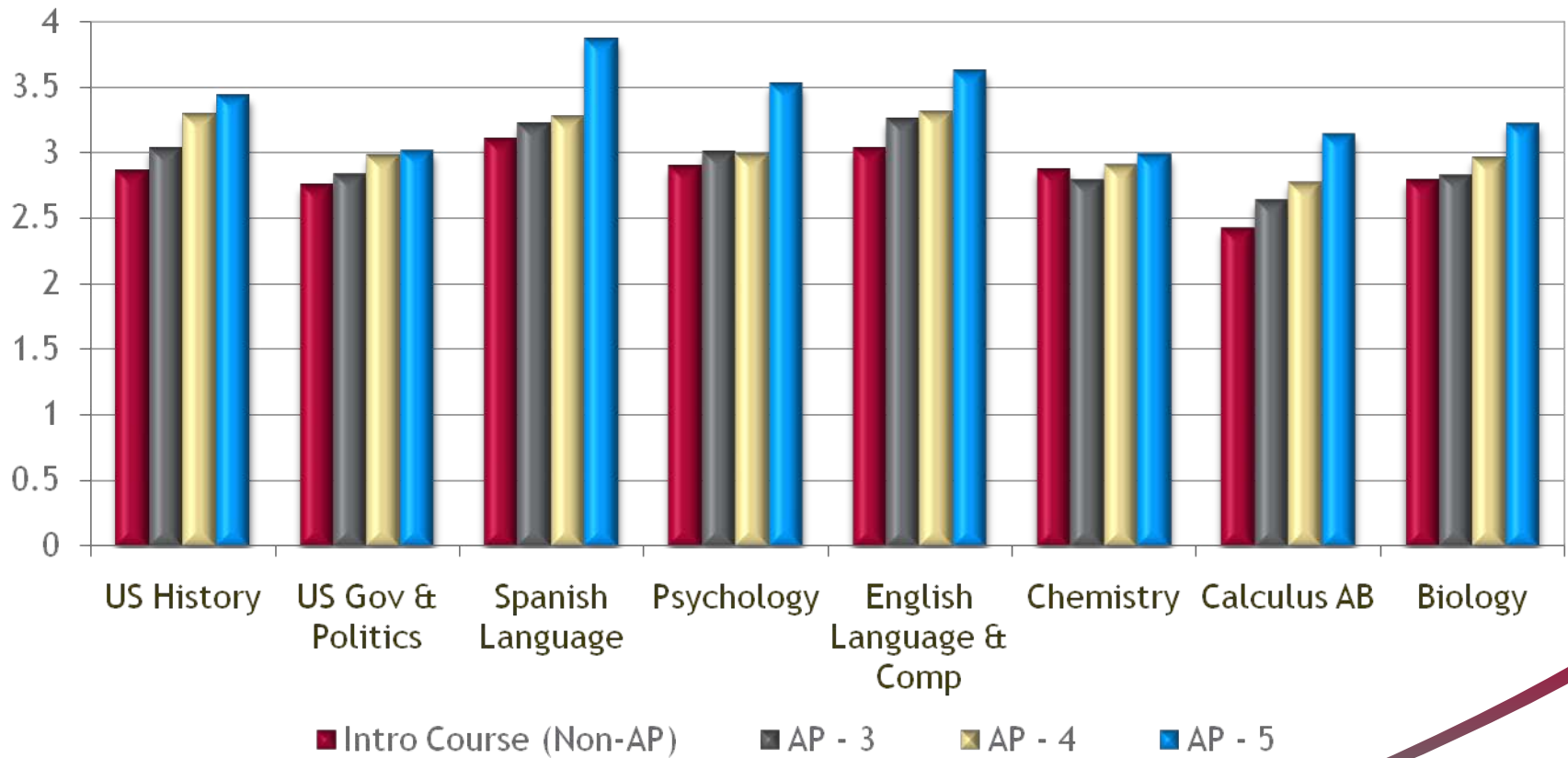
Adapted from Mattern, Shaw, & Ewing, 2011



AP science students choose to pursue STEM careers at much higher rates than their peers

Course	Female Students Who:		African-American Students Who:		Hispanic Students Who:	
	Took AP & Chose Major	Did Not Take AP & Chose Major	Took AP & Chose Major	Did Not Take AP & Chose Major	Took AP & Chose Major	Did Not Take AP & Chose Major
Biology	20%	6%	18%	6%	16%	4%
Chemistry	15%	1%	14%	2%	13%	2%
Physics B	16%	3%	31%	7%	25%	8%
Physics C: E&M	25%	2%	48%	6%	47%	7%

Students who earn 3+ on AP Exams tend to earn higher GPAs in subsequent courses





What We're Changing and Why

Dominic Castignetti, Loyola University Chicago

AP course & exam redesign

- Part of an overall AP evolution to maintain alignment with current best practices in college-level learning
- Represents a collaboration among college faculty, AP teachers, and learning and assessment specialists
- Starts with exams in history, science and world languages

National organizations offered recommendations for redesigning AP science courses

A 2002 National Research Council Report recommended:

- The primary goal of AP should be to help students develop a deep understanding of the organizing concepts and principles in Biology.
- Curricula for advanced study should emphasize depth of understanding over exhaustive coverage of content.
- Curricula should focus on central organizing concepts and principles and the empirical information on which those concepts and principles are based.
- Curricula should be focused on a reasonable number of concepts that can be studied in depth.

Goals of the AP science redesign

Produce a More Inclusive and More Engaging Program of Study for Each AP Science Discipline by Identifying:

- The concepts to be studied in depth and measured on the exams
- The need for a reduction in breadth of course content and an increase in depth of understanding
- The essential reasoning and inquiry skills that are to be supported with instruction and measured on the exams
- Emerging areas of research that capture essential concepts within the discipline and engage diverse student populations
- The minimum resources required to support these practices



The AP Biology revision was created in collaboration with college biology faculty...

Spencer Benson,
University of Maryland

A. Malcolm Campbell,
Davidson College

Robert Cannon,
Univ. of North Carolina, Greensboro

Liz Cowles,
Eastern Connecticut University

Janice Earle,
National Science Foundation

Michael Gaines,
University of Miami

Pamela Gunter-Smith,
Drew University

J.K. Haynes,
Morehouse University

Doris R. Helms,
Clemson University

John R. Jungck,
Beloit College

Pat Marsteller,
Emory University

Jim Pellegrino,
*University of Illinois
at Chicago*

William B. Wood,
University of Colorado

Jeanne Pemberton,
University of Arizona

Mark Reckase,
Michigan State University

John Smarelli,
LeMoyne College

Nancy Songer,
University of Michigan

Kathy Takayama,
Brown University

Gordon Uno,
University of Oklahoma

Brad Williamson,
University of Kansas

...In collaboration with expert secondary school biology teachers....

Arnold Best,
Tri-Cities High School

Elizabeth Carzoli,
Castle Park High School

Sharon Radford,
Paedeia High School

Peggy O'Neill Skinner,
The Bush School

Julie Zedalis,
The Bishop's School



...And validated through a study with 60 biology department chairs and faculty at leading institutions

American University

Amherst College

Barnard College

Baylor University

Boston University

Bowdoin College

Brigham Young University

California State Polytechnic University

California State University - Fresno

Carleton College

Carnegie Mellon University

Claremont McKenna College

Clemson University

Colby College

Colgate University

College of Charleston

College of the Holy Cross

Connecticut College

Cornell University

Davidson College

Georgetown University

Georgia Institute of Technology

Haverford College

Iowa State University

Johns Hopkins University

Loyola University Chicago

Notre Dame University

Ohio State University

Penn State University

Pepperdine University

Rochester Institute of Technology

Stanford University

SUNY Center Albany

Trinity College

Union College

University of Alabama

University of Arkansas Fayetteville

University of British Columbia

University of California, Los Angeles

University of California, Riverside

University of California, Santa Barbara

University of Central Florida

University of Colorado

University of Connecticut

University of Florida

University of Iowa

University of Kentucky

University of Mary Washington

University of Maryland

University of Pittsburgh

University of Tennessee Knoxville

University of Vermont

University of Virginia

University of Wisconsin - La Crosse

University of Wisconsin - Madison

Villanova University

Washington State University

Wellesley College

Whitman College

Yale University

Validation study participants indicated the new curriculum has achieved its stated goals

- Faculty view the new AP Biology curriculum as effective in preparing students for success from day one in sequent biology courses.
- Overall, biology professors feel that the College Board has found a sufficient balance of breadth versus depth with the new AP Biology curriculum.
- Biology professors have a relatively favorable view of students taking this new curriculum in high school and obtaining credit towards introductory biology in college.

College faculty who participated in the validation study concur that the revised Biology course will effectively prepare students for subsequent college biology courses

Effectiveness of new curriculum at preparing students for success from day one in sequent Biology courses

Distribution - Sessions 1 & 2 (n=60)

	← Not at all effective			Highly effective →						
Ranking	1	2	3	4	5	6	7	8	9	10
# of Respondents	0	0	2	0	3	2	9	25	12	7

Mean: 7.9

Median: 8

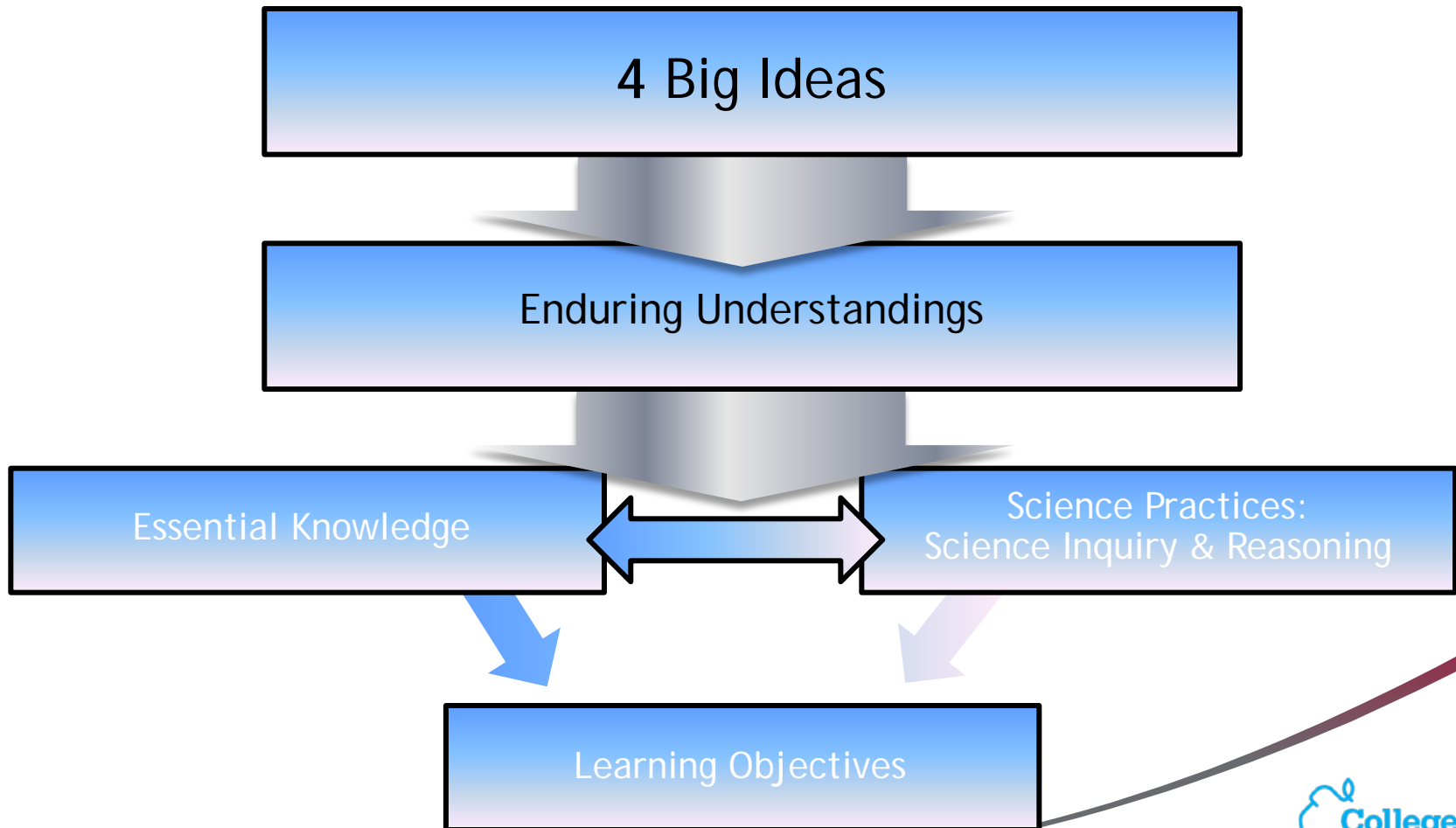


The background of the slide is a photograph of a school hallway. The hallway is bright and modern, with large windows on the left and blue pipes running along the ceiling. Several people are walking in the hallway, some in motion, creating a sense of activity. The text 'SHERWOOD HIGH SCHOOL' is visible on the wall in the distance.

Overview of AP Biology Revisions

Shari Cohen, College Board Consultant

Structure of the AP biology curriculum framework supports and furthers conceptual knowledge



Curriculum Framework: Big Ideas

The unifying concepts or Big Ideas increase coherence both within and across disciplines. A total of Four Big Ideas:

- BIG IDEA **1** The process of evolution drives the diversity and unity of life.
- BIG IDEA **2** Biological systems utilize energy and molecular building blocks to grow, reproduce, and maintain homeostasis.
- BIG IDEA **3** Living systems retrieve, transmit, and respond to information essential to life processes.
- BIG IDEA **4** Biological systems interact, and these interactions possess complex properties.

Building enduring understandings

For each Big Idea, there are enduring understandings which incorporate core concepts that students should retain. Total of 17 enduring understandings across the four Big Ideas.

BIG IDEA

1

The process of evolution drives the diversity and unity of life.

- Enduring Understanding 1.A: Change in the genetic makeup of a population over time is evolution
- Enduring Understanding 1.B: Organisms are linked by lines of descent from common ancestry
- Enduring Understanding 1.C: Life continues to evolve within a changing environment
- Enduring Understanding 1.D: The origin of living systems is explained by natural processes

Factual recall reduced for exam

Learning Objectives provide transparency and boundaries for what content and science practices will be assessed

Content

+

Skill

**Learning
Objective**

Essential Knowledge 1.A.3

Genetic drift is a non-selective process occurring in small populations

Science Practice 1.4

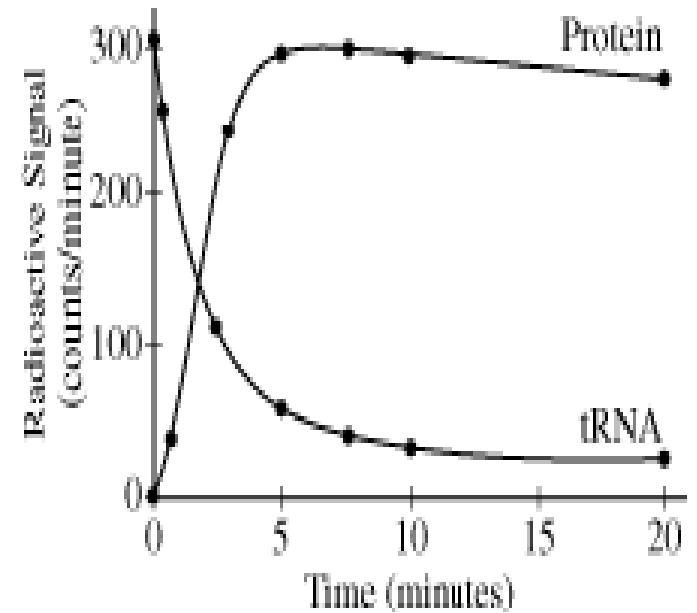
The student can *use representations and models to solve problems* qualitatively and quantitatively.

Learning Objective 1.6

The student is able to use data from mathematical models based on the Hardy-Weinberg equilibrium to analyze genetic drift and effects of selection in the evolution of specific populations.

Sample Single-Part Question

Q1: The role of tRNA in the process of translation was investigated by the addition of tRNA with attached radioactive leucine to an in vitro translation system that included mRNA and ribosomes. The results are shown by the graph.



In a short paragraph, describe how this figure justifies the claim that the role of tRNA is to carry amino acids that are then transferred from the tRNA to growing polypeptide chains.

The new AP Biology course emphasizes inquiry-based, student-directed labs

- Teachers are expected to devote **25 percent of instructional time to lab investigations**, including two investigations per big idea; eight per course.
- Teachers may **adapt their existing labs** for inquiry-based investigations or use labs from the **new, free, lab manual**



In student-directed labs, students:

1. Generate questions for investigation
2. Choose variables to investigate
3. Design and conduct experiments
4. Collect and analyze data
5. Present their conclusions

Overall, revisions to AP Biology support needs of students, teachers, and higher education

Benefits for AP Students

- Improvement in critical thinking and skills application
- Deeper interaction with concepts and required content
- Greater opportunity for success in sequent college biology courses

Benefits for AP Teachers

- Curriculum better defined and more narrowly focused on important key concepts
- Opportunities to instruct students in deeper, meaningful ways based on teachers' strengths their students' interests
- Clear transparency into what will be tested on the AP Exam

Benefits for Higher Education

- More competitive, prepared and motivated incoming applicant pool
- Faculty receive students even better prepared to contribute to academic discourse

Changes and continuity

What's Changed?

- Curriculum frameworks articulate what students should know and do upon successful completion of the course and exam.
- A focus on deep, conceptual knowledge, not rote memorization
- Narrower scope of required course content that enables increased focus on the development, application, and integration of skills important to each discipline

What Remains the Same?

- Rigorous, college-aligned courses and exams
- Exam grading on a scale from 1-5
- Students earning 3s or higher are even more prepared to succeed in the subsequent course at college
- Local control over designing actual curriculum

The AP Biology redesign has received positive feedback to date

“The changes to the AP Biology course provide greater emphasis on the type of scientific inquiry that increases reasoning skills and conceptual understanding....

...These revisions represent a major reform in science education that will enable many more young Americans to experience science as a special “way of knowing” about the world.” **Bruce Alberts, Editor-in-Chief, Science**

“The scientific community is reacting positively to the changes to the AP Biology exam...

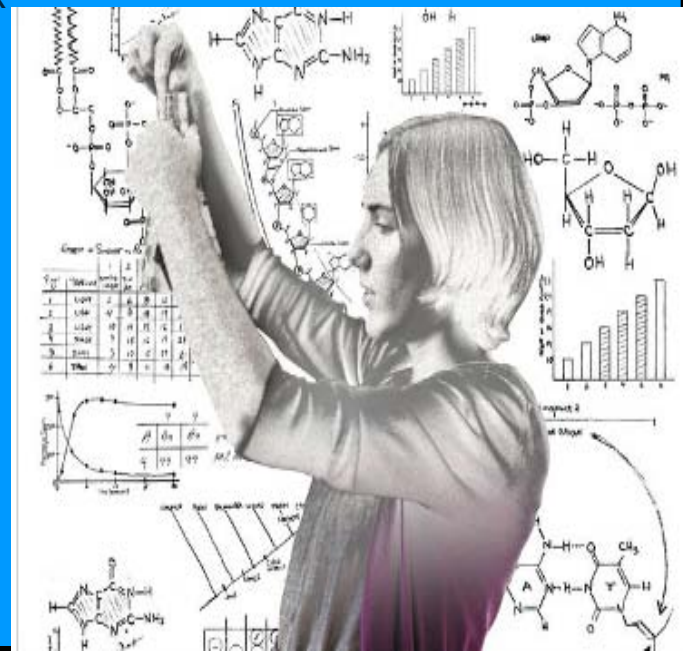
...The changes will more closely align what goes on during a high school biology course with the current ‘best practices’ for introductory college biology.”

Steven L'Hernault, Professor and Dept Chair, Emory University

“The College Board took criticisms to heart, and has been working with hundreds of college professors and high school teachers to develop the new approach.”

NY Times (Jan 2011)

The New York Times



The background of the slide is a photograph of a school hallway. The hallway is bright and modern, with large windows on the left side. Several people are walking in the hallway, some in motion, creating a sense of activity. The ceiling has large blue pipes and circular lights. On the right wall, there is a sign that says 'SUNSHINE HIGH SCHOOL'. The floor is light-colored and has a large square pattern in the center.

Impacts of AP Redesign on Higher Education

Marc Geslani, College Board Midwestern Regional Office

The redesigned AP Biology curriculum provides added benefits for enrollment managers

- Students who succeed on AP Biology Exams present evidence of mastery in an enhanced way
- AP Biology students participate in inquiry-based lab work, skills which will transfer to college lab settings
- We expect that current strong student outcomes for AP Biology will be amplified

There are several things enrollment managers can do with regard to Biology and other redesigned AP courses and exams

- Communicate changes to your department chairs
 - Encourage faculty to review the Curriculum Framework
 - Visit <http://advancesinap.collegeboard.org> for additional information
- Ensure your institution has an evidence-based AP credit and placement policy for Biology
 - Review the alignment of the new curriculum with your Biology department
 - Participate in an ACES or other validity research study
- Consider targeted recruitment of AP STEM students, beginning with Biology in Fall 2013
 - Reach out to students who send AP Biology Exam scores in Summer 2013
 - Use the course ledger as tool for recruitment and validating AP course experience

AP course and exam revision schedule

Fall 2011 (Exams in Spring 2012)

- French Language and Culture
- German Language and Culture
- World History

Fall 2012 (Exams in Spring 2013)

- Biology
- Latin
- Spanish Literature and Culture

Fall 2013 (Exams in Spring 2014)

- Chemistry
- Spanish Language and Culture

Questions? Contact us:

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- Marc Geslani: mgeslani@collegeboard.org



Appendix

These revisions will invigorate undergraduate biology education with research and pedagogical relevance

Recommendations

- Build a strong interdisciplinary curriculum
- Foster conceptual understanding of the science of life
- Design meaningful laboratory experiences within the curriculum
- Emphasize experimental design
- Emphasize the knowledge and application of quantitative skills

Redesign Addresses

- Inclusion & integration of concepts fundamental to biology, chemistry, physics, math, computer science, and engineering to help make interdisciplinary connections
- Inquiry-based and student-directed laboratories with emphasis on **quantitative skills**
- Emphasis on the integration of science process skills and quantitative lite