

**Redesign of the Advanced Placement  
Program<sup>®</sup> (AP<sup>®</sup>) Biology Course,  
Examination, and Teacher Professional  
Development Experience**

***A Partnership Between the College  
Board and the National Science  
Foundation***

# Project Staff

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# Project Advisory Committee

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- *Doris R. Helms*
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Le Moyne College
- *William B. Wood*
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University of Colorado at Boulder

# Project Timeline

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- *October 2003 – February 2005  
(Phase One)*

# Project Summary

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- *A major long-term initiative aimed at dramatically improving the quality of learning and teaching in Advanced Placement (AP) science courses.*
- *Undertaken in response to a 2002 report on advanced studies in mathematics and science from the National Research Council that recommends specific changes in advanced study in the sciences.*

# Phase One (Focus of this RETA Project)

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- *The establishment of a continuing dialogue with scientists and educators across the nation in order to inform the process by which the College Board will redesign the course, examination and teacher professional development materials and activities for its AP Biology course.*

# Phase Two

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- *Work during Phase I will inform the development, field-testing and evaluation of new AP Biology course materials, exams and teacher professional development experiences.*
- *Work during Phase I will also inform the process by which the College Board redesigns its AP Chemistry, AP Physics and AP Environmental Science courses.*

# Project Goals

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- *1) To collect, analyze, and synthesize information from a wide range of sources (input from scientists and educators, recent reports and studies on effective science instruction, etc.) on the most promising, effective, and up-to-date courses, teaching strategies, and inquiry-based approaches to learning in undergraduate introductory-level biology courses.*
- *2) To plan a redesign of the AP Biology course, examination and teacher professional development that reflects the knowledge and resources acquired from this process.*



# Project Goals (Continued)

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- *3) To identify promising strategies and approaches to increase access and success in AP Biology among underrepresented students, particularly in urban and rural schools.*
- *4) To design a program for field-testing the new course, exam and professional development offerings after the completion of this initial phase of work.*

# A Focus on Learning With Understanding

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- *As it pursues this work, the College Board will be guided by the findings, principles and recommendations of the NRC report.*
- *In particular, the College Board will focus on the need to develop AP science courses, examinations, and instructional strategies that better promote learning with understanding.*

# Seven Research-Based Principles Of Human Learning

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- *1) Learning with understanding is facilitated when new and existing knowledge is structured around the major concepts and principles of the discipline.*
- *2) Learners use what they already know to construct new understandings.*
- *3) Learning is facilitated through the use of metacognitive strategies that identify, monitor, and regulate cognitive processes.*

# Seven Research-Based Principles Of Human Learning (Continued)

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- *4) Learners have different strategies, approaches, patterns of abilities, and learning styles that are a function of the interaction between their heredity and their prior experiences.*
- *5) Learners' motivation to learn and sense of self affects what is learned, how much is learned, and how much effort will be put into the learning process.*
- *6) The practices and activities in which people engage while learning shape what is learned.*
- *7) Learning is enhanced through socially supported interactions.*

# Fundamental Questions

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- *These questions will guide the series of conversations with biologists and educators throughout this project:*
  - What are the key concepts and process skills that all middle school and early high school students must understand in science in order to prepare them for success in AP and other advanced, introductory-level college courses?
  - What are the central concepts and themes that “must be covered” as part of the redesigned AP Biology course?
  - How should the level of proficiency vary depending on whether or not a student intends to pursue an academic career in a STEM field?
  - What instructional strategies best enable students to achieve these learning goals?

# Anticipated Short-Term Outcomes

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- A national consensus on the content of the course and examination in AP Biology that reflect the rigor, standards, and inquiry-based approaches to teaching and learning that were recommended in the NRC (2002) report.
- The identification of an initial set of strategies—to be field-tested in selected school districts during subsequent phases of this initiative—aimed at increasing access to and success in AP Biology courses among traditionally underrepresented students.

# Anticipated Long-Term Outcomes

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- **Research-based and enhanced courses, examinations, and teacher professional development experiences for AP Biology, AP Chemistry, AP Environmental Science, and AP Physics courses that better incorporate knowledge about how students learn, and that provide greater opportunities for students to experiment, to critically analyze information, and to solve problems—as recommended in the 2002 NRC report.**
- **The identification of research-based strategies that schools and teachers can use to increase access to and success in AP science courses among traditionally underrepresented students.**

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