shaping outcomes
MAKING A DIFFERENCE IN LIBRARIES AND MUSEUMS

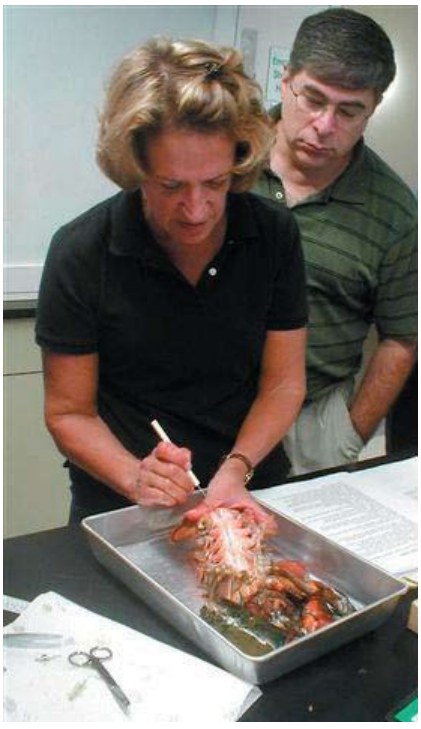
Peabody Museum Biodiversity Learning

Case Overview

The Yale Peabody Museum of Natural History started the Peabody Fellows Biodiversity Learning Opportunities Initiative in 2003 along with partners from science departments at Yale University and four Connecticut area public school boards. This initiative aims to educate and excite students in grades 4-8 about science and the natural world by providing guidance and support to area teachers.

The New Haven and nearby urban school districts (Waterbury, Bridgeport, and West Haven) had been designated as among the "most needy" for science reformation by the Connecticut Academy for Education in Science, Mathematics, and Technology. The mandatory Connecticut science mastery test, previously only administered to 10th graders, is being extended into middle schools. An ongoing plan is needed to address the needs of both students and teachers.

The Peabody Fellows program provides a yearly professional and curriculum development seminar for upper-elementary and middle-school teachers. The week long class is held in the summer, with 5 weekend workshops during the school year for reinforcement and support. These classes are designed to increase the teachers' skills in developing science lessons using inquiry-based science education methods and to develop science curriculum units that align with state and national science standards. Classes include a variety of lectures and presentations given by Peabody Museum curators, collection managers and other members of the Yale scientific community. Participating teachers are given Yale University library privileges, a Peabody museum membership, and access to special classroom programs at the museum. On-site technical assistance is provided to the teachers by the Yale Peabody Museum's Science Educator and Curriculum specialist and mentor teachers from previous Peabody Fellows program years. Since 2003, up to five Yale University graduate students each year work in the classroom with a Peabody Fellow Teacher, providing support in teaching and communication skills.



To address the lack of material resources for science education, two mobile "BioAction Labs" with a total of 16 carts are provided. These carts are filled with over 300 hands-on natural history specimens (such as fossils, plants, animal skins and skeletal materials), a computer, a nature video library and a stereo-microscope especially designed for young students.

A major strength of the Peabody Fellows program has been its ability to evolve according to the needs of its participants. Support from the Institute of Museum and Library Services (IMLS) will expand the scientific scope and reach of the 2005-07 cycle of the program. This grant will allow the program to focus on integrated teaching of earth and life science with an emphasis on biodiversity and global changes. This content change will draw on the strengths of Yale's School of Medicine, Department of Epidemiology & Public Health and the School of Forestry and Environmental Studies, both leaders in the study of global changes.

The Yale Peabody Museum of Natural History at Yale University was founded in 1866 to serve Yale University by pursuing an understanding of earth's history through geological, biological, and anthropological research.

Museum leaders believe that one of the most pressing problems of our time is the preservation of the world's biological and cultural diversity, and that it is their duty to play a role in improving literacy in this area. For more information about the Peabody Fellows program visit them on the web at http://www.yale.edu/peabody/education/fellows/pages/about.html.

Yale's Department of Epidemiology & Public Health and the School of Forestry and Environmental Studies are both highly concerned with how biodiversity affects humans and our environment. A number of curators at the Peabody Museum of Natural History are based in these two schools. Many Yale graduate students who assist in the Peabody Fellows program come from these schools. For more information visit Yale on the web at http://www.yale.edu/.

Profiles of Stakeholders

These are fictional statements typifying attitudes and illustrating needs, not actual direct quotations.

Participating Teacher

We don't have much in the way of science curriculum units or research materials in my school, and I don't have any training in integrated teaching. So though the Peabody program is demanding, I'm willing to put in the time I need to enhance my skills and understanding. My goal is to strengthen my students' basic science
skills and prepare them for the Connecticut science mastery test."

School Board Member

"Studies have shown that our school district is really falling behind when it comes to the sciences. Barely 11% of our urban high school students meet Connecticut's mastery standards for science. We need to catch this problem early by instilling strong science skills in students before they reach high school. The best way to do that is to provide the teachers with the training they need to make classroom time as productive as possible and to make the subject interesting to the students."

Peabody Museum Director

"Interdisciplinary learning is something the teachers have been wanting for years. You can't be a one topic scientist and understand global change. Our goal is to recruit 32 teachers for the new phase of our program."

School of Forestry and Environmental Studies Faculty Member

"I've been teaching the importance of biodiversity and global change for more than a decade. These are subjects that affect everyone. So I'm pleased with the Peabody program's new emphasis on these issues. I'm also excited about working with the Department of Epidemiology & Public Health. This interdisciplinary partnership will allow us to study how biodiversity and global changes affect human health as well as the planet."

IMLS

“This is a project we feel is a safe investment. It’s been successful for seven years, thanks to careful planning, strong leadership, and public interest. The next phase of the project should only make it stronger.”

Logic Model Worksheet

I. Situation: program partners and stakeholders	
What is the program's **name**?	Peabody Museum Biodiversity Learning
What **partners** are involved?	
Who are the program's **stakeholders**? (Be sure to include yourself, your target audience, partners, funders and any other stakeholders.)	What does each **stakeholder** want to know?
Peabody Administration	Does the project support the mission? Does the project create a positive outlook toward Peabody by the participants?
Yale University Departments	Do our graduate assistants learn how to communicate effectively and improve their teaching skills?
New Haven (and other) School Boards	Do the participating teachers gain skills in teaching that will engage students and improve their scores on mastery tests? Will instructional materials be improved and strengthened?
Teachers Participating	Can I apply what I learn in my classroom? Are the students more involved and successful?
IMLS	How many people participate in this project or use this product? What will they learn? Will this project meet the need that shaped it?
II. Program planning: connecting needs, solutions, and results	
Who are the **audiences**?	•32 upper elementary and middle school teachers (grades 4-8) in four participating districts •800 grade 4-8 students (of the above teachers)

What are the **needs** of the audience?	•Upper elementary and middle school teachers in New Haven and neighboring districts lack training in inquiry-based science education. Their students, according to a study of science education, need improvement to meet state standards and new mastery tests. Teachers of 4th-8th grades are actively seeking new instructional techniques to strengthen their students' basic science literacy and inquiry skills. •Middle school teachers statewide are eager to learn more engaging science content and interactive teaching techniques. •Material resources for science education (microscopes, models, specimens) are lacking. Science curriculum units aligned with national, state and local grade-level standards are scarce.
What are some **audience considerations?**	•Cooperation is important in order to obtain and share information with teachers. •Teachers' time is valuable and there is not a lot of time available. •Students need encouragement and motivation.
What **solution** fulfills the needs?	Provide intensive professional development and museum support to enhance skills for inquiry-based science education and curriculum development for grade 4-8 teachers in districts identified as needing strengthened science teaching. Museum supports include a mobile laboratory and classroom kits. Focus content on teaching earth and life science with an emphasis on biodiversity and global changes.

What will be the **desired results?**	•Increase teacher skills in science curriculum development and use of inquiry-based science education methods. •Increase teacher understanding and effective instruction on integrated teaching of earth and life science with an emphasis on biodiversity and global changes. •Increase skills of 4th – 8th grade students in inquiry-based science associated with biodiversity and global changes.

II. Logic model summary: program purpose statement

We **do** what?	•Professional development for teachers in inquiry-based science education and curriculum development •On-site technical assistance •Two mobile "BioAction Labs" for hands-on exploration of biodiversity •Museum "BAK-pak" kits available on loan to teachers who complete program
For **whom**?	Teachers in upper elementary and middle schools (grades 4 – 8) in low-scoring districts on science mastery and their students
For what **outcome**/benefit(s)?	•Increase teacher skills in science curriculum development and use of inquiry-based science education methods •Increase teacher understanding and effective instruction on teaching of earth and life science about biodiversity and global changes •Increase skills of 4th – 8th grade students in inquiry-based science

IV. Program elements

Inputs	**Outputs (or counts)**
Yale graduate students to provide technical assistance for curriculum development and inquiry-based teaching	5 graduate students

Science Educator/Curriculum Specialist to develop and lead summer institutes/workshops, and to provide ongoing guidance and coaching	1 education/curriculum specialist
Traveling BioAction Labs	2 traveling BioAction Labs
BAK-pak kits	
Website consultant to increase interactivity of museum site and to disseminate curricula	1 website consultant
Museum passes for participating students' families	800 family passes
Family museum memberships for teachers	
Yale University Library privileges for teachers	32 Yale University Library privilege cards
Special museum education programs for participating classrooms	
Activities	**Outputs (or counts)**
Recruit schools and teachers	Number of schools and teachers
Schedule summer institutes and follow up weekend workshops	
Manage logistics of traveling BioAction Lab	
Develop and implement professional development programs for teachers (institutes, workshops)	2 summer institutes 5 follow-up weekend workshops
Enhance museum website for dissemination of curricula	Percent increase in numbers of site visitors
Administer pre- and post-measures to teachers and students	
Compile and analyze data for program improvement and progress reports to stakeholders	
Services	**Outputs (or counts)**
Training for teachers in summer institutes, follow-up weekend workshops; also includes museum membership, Yale University library privileges, and special classroom programs at museum	32 workshop participants

On-site technical assistance provided by: (a) the museum's Science Educator/Curriculum Specialist; (b) exemplary mentor teachers from previous Peabody Fellows Program years; and (c) five Yale University graduate students (funded by NSF K-12 teaching fellowships) in environmental studies, biological sciences and public health	
Two mobile "BioAction Labs" for hands-on exploration of biodiversity	
Use of museum "BAK-pak" kits	Number of kits used

V. Outcomes

Outcome 1: ***Teachers will increase skills and self-efficacy in science curriculum development and inquiry-based science methods.***

Indicator(s)	Applied to	Data Source	Data Interval	Target
The # and % of teachers who develop a complete science curriculum unit that meets program guidelines and standards **AND**	Grade 4 – 8 teacher participants in Peabody Fellows Program	External evaluator's observation of all professional development activities Quantitative analysis of completed curricula (based upon evaluator's rubric scoring of six domains)	Evaluator observes 100% of 2 summer Institutes and 5 workshops Annual assessment of each completed curriculum	85%

The # and % of teachers who implement completed science curriculum unit in the classroom	Grade 4 –8 teacher participants in Peabody Fellows Program	Evaluator's classroom observations of teacher skill development Pre- and post-survey of knowledge & attitudes	1-2 observations per teacher during classroom implementation of curriculum Pre- and post-fellowship survey (April '05 & August '06)	80%

Outcome 2: ***Students will increase knowledge of inquiry-based science related to biodiversity and human health.***

Indicator(s)	**Applied to**	**Data Source**	**Data Interval**	**Target**
The # and % of students who increase their knowledge in 3 domains in science literacy; biodiversity; and can effectively detail (to the teachers' satisfaction) the linkages between biodiversity and global change	Grade 4 – 8 students in participating districts	Student performance task Assessment (concept maps, observational drawings)	Pre- and post teachers' implementation of curriculum	80%