

# The Maryland Upper Elementary/Middle School Science Teacher Professional Continuum Mode



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## Summary

Project Nexus promotes quality science education by developing and testing an exemplary model that prepares supports and sustains *upper elementary and middle level* specialist science teachers. Project NEXUS teachers will benefit from a baccalaureate program that features connecting transformative undergraduate science content courses with science method courses, supported internship experiences with adolescent students in informal education contexts, field placements in urban professional development schools and ongoing innovative educational experiences addressing the needs of minority and urban students, participation in an induction LISTSERV, and continuous university, public school district, and informal education support during their induction years. Participants in the 5-year project include 150 new specialist science teachers and 40 practicing mentor teachers (formal and informal science education domains).

## Rationale

### Current need in science teacher preparation

To increase the number of elementary teacher education majors who concentrate in science, particularly those typically underrepresented  
 To increase the number of qualified upper elementary/ middle school science teachers, particularly those typically underrepresented

### Builds on previous research

Maryland Collaborative for Teacher Preparation (MCTP), a National Science Foundation funded project in the CETP.

## Central Research Question

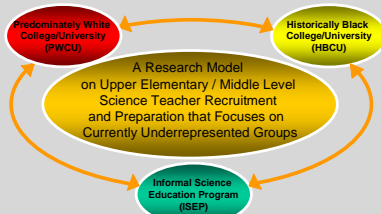
To what extent of success (and for what reasons) can undergraduate elementary teacher education majors, particularly those from currently underrepresented groups, with demonstrated interest and performance in science be:

*recruited, prepared and supported*  
 to teach upper elementary/ middle science in a manner consistent with standards-based recommendations?

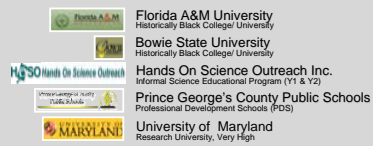
## Key Assumption

The key assumption is that science educational practices require systemic reform within the undergraduate science subject matter and education classes, prospective teachers' field based experiences, and professional development during new teachers induction years (NSF, 1993; NRC, 1997; Sunal, Wright, & Day, 2004).

## Model



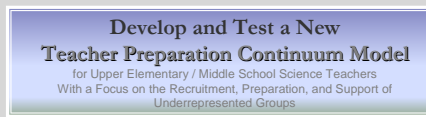
## Collaborating Partners



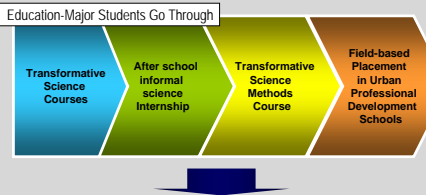
## Objectives

- To build a new teacher preparation continuum model for upper elementary/middle school science teachers with an undergraduate academic minor in science content who can pass standardized exams in their content field.
- To implement this model at the University of Maryland, College Park and Florida A & M University in partnership with an Informal Science Education Program (e.g., Hands on Science Outreach)
- To increase the number of elementary teacher education majors who concentrate in science, particularly those typically underrepresented.
- To increase the number of qualified upper elementary/middle school science teachers, particularly those typically underrepresented.
- To evaluate the model's effectiveness.
- To conduct research on the model.
- To disseminate the model locally and nationally.

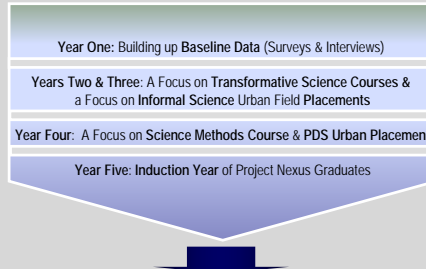
## Overarching Goal



## I. Implementing the Model



## II. Investigating the Model



## III. Disseminating the Model

- College/ university seminars
- Professional association conferences
- Journal articles/ reports
- PDS interaction
- Website: [www.projectnexus.umd.edu](http://www.projectnexus.umd.edu)



## Findings (Year 2)

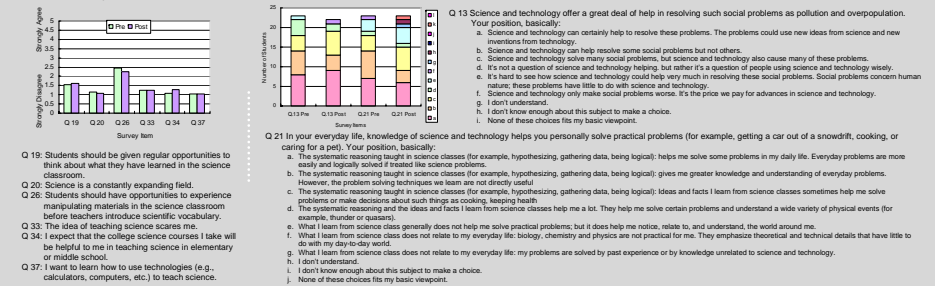
### Transformative Science Class Study

**Research Question:** To what level of success and for what reasons does participation in undergraduate science content courses that exemplify the use of an inquiry perspective affect the recruitment and preparation of teacher interns, particularly those who are members of underrepresented groups, to be science specialist upper elementary/middle school teachers?

**Sample:** 24 students (1 African American + 2 Hispanic + 3 Asian/Pacific Islanders + 5 Others + 13 Caucasians)

**Data collection strategies:** Surveys + Interviews + Observations

### Sampled Survey Questions:



### Undergraduate Advisor Study

**Research Question:** To what level of success and for what reasons is it possible for undergraduate academic advisors to recruit undergraduate college students with academic majors and minors in content, particularly those who are members of underrepresented groups, to be science specialist upper elementary/middle school teachers?

**Sample:** 8 HBCU Advisors: 4 Science + 4 Education; 10 PWCU Advisors: 4 Science + 2 Education + 4 Others

**Data collection strategies:** Semi-structured Interviews

### Sample Insights:

- For what reason(s) do undergraduate students in science (or those who have an interest in science) express an interest in teaching upper elementary/middle school science?
 

*Insight:* Advisors in both science and education at the HBCU hear students express interest in teaching to *give back* to their community. This is not mentioned by advisors at the PWCU. The science content advisors see the elementary level as a unitary thing; the education advisors see it as consisting of two parts-level grades (1,2,3) for generalists and upper grades (4,5) for subject matter specialists. The science advisors do not broach the notion of teaching with their advisees unless the advisees bring it up. At the PWCU, it is rare to hear student interest in teaching science at the elementary or middle level, but it is mentioned occasionally at the high school or college level.
- For what reason(s) do undergraduate students in science or those who have an interest in science NOT express an interest in teaching upper elementary/middle school science?
 

*Insight:* Both the science advisors and the education advisors express that students avoid science teaching as a career in the elementary and middle grades due to its perceived lack of status, salary, and lack of parental support for it as a career.

### After School Informal Science Internship Study

**Research Question:** To what level of success and for what reasons do field-based placements in after school informal science education programs that serve adolescent students affect the recruitment (and preparation) of college students, particularly those who are members of underrepresented groups, to be science specialist upper elementary/middle level teachers?

**Sample:** Fall, 2006: 4 interns (1 African American Male + 3 Africa American Females)

Spring, 2007: 25 interns (2 Hispanic Females + 3 Asian/Pacific Islander Females + 5 African American Females and Male + 14 Caucasian Females + 1 Other Female)

**Data collection strategies:** Interviews + Observations + Draw-a-scientist + Surveys + Artifact collection + Reflections

(Findings forthcoming)

## Implications for the Future

- To institutionalize transformative science courses in teacher preparation.
- To provide undergraduate advisors valid information on recruiting students to science teaching, particularly underrepresented populations.
- To link formal and informal science education in teacher preparation.