

NAME: W&M HHMI Undergraduate Science Education Program

INSTITUTION: College of William and Mary

SCHOLARSHIPS TO TAKE SUMMER INTRODUCTORY CHEMISTRY COURSE

Inputs	Strategies	Outputs	Outcomes		Impacts (Long Term)
			(Short Term)	(Medium Term)	
<p>Students from W&M - Wren Scholars</p> <p>Summer stipends for students (taking chemistry) & cost-share from W&M for stipends for all Wren Scholar participants.</p> <p>Salary support from William and Mary</p> <p>Salary support for instructor</p> <p>Free housing for students (cost share from W&M)</p> <p>Faculty Advisory Committee: support and evaluate program</p> <p>Website to publicize program, submit and review applications, and disseminate results of program</p> <p>Mechanisms for tracking and evaluation</p> <p>Classroom and lab space</p> <p>Primary W&M faculty mentors and secondary mentors in related fields</p>	<p>Provide Wren Scholars with funding to offset tuition to take chemistry during summer session following freshmen year</p> <p>Schedule informal & formal tutoring sessions</p> <p>Students will also spend 5 hours per week in the lab helping with experiments and becoming part of the summer community</p> <p>Organize weekly meetings on quantitative topics</p> <p>Provide opportunities for weekly pizza lunches to discuss topics relevant to science research, e.g. ethics, how to make posters, etc.</p>	<p>Number of underrepresented/at risk students who participate in summer chemistry</p> <p>Number of faculty/ students who mentor students in the program during the summer</p> <p>Number of students from underrepresented groups who present at the summer research symposium and other venues</p> <p>Number of students who participate in workshops and discussion groups</p>	<p>Students feel more confident about chemistry; students perform better on exams and in course</p> <p>Students feel more comfortable asking for help</p> <p>Students develop a comfort level in discussing chemistry with colleagues</p> <p>Students become familiar with lab research environment</p> <p>Students feel like part of a larger research team within the lab and within the department.</p>	<p>Students from underrepresented groups and disadvantaged backgrounds perform much better in introductory chemistry</p> <p>Students continue their interest and involvement in scientific research throughout their undergraduate years.</p> <p>A greater number of students continue to major in STEM fields.</p> <p>Students who participate perform better in STEM courses.</p> <p>Students perform better in subsequent chemistry courses and in other courses requiring quantitative skills</p> <p>Students and faculty continue with research during academic year.</p>	<p>Increased number of URM students are engaged in science-related activities and professions following graduation.</p> <p>Students value integration of scientific research across levels of a discipline</p> <p>URM students and faculty contribute to the scientific community</p> <p>Institutions place a high value on providing significant undergraduate research as part of the institution's culture; institution is proactive about promoting diversity and recognizing its value.</p> <p>Students pursue chemistry and chemistry-related fields; help more junior students overcome issues with introductory courses</p>

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Evaluation Questions for OUTCOMES	Possible Indicators/Measures	Possible Data Collection Methods and Information Sources	Rank/Priority (include brief rationale)
<p>1. Do the summer chemistry courses contribute to the ability of students to master the content and continue to next level?</p> <p>2. Has the program resulted in successful mentoring of students and success beyond the summer?</p> <p>3. Does the summer course and the collaboration within labs result in long term success of both the students and faculty members?</p> <p>4. Does the program serve as a good model for increasing diversity in the sciences? Has the program had an impact beyond the institution?</p>	<p>1 a. Students are able to show that they have mastered the content by exam questions of various levels.</p> <p>b. Students are able to show mastery of analytical concepts and questions.</p> <p>c. Students continue to pursue opportunities to study chemistry.</p> <p>d. Students are excited about their research and continue to pursue opportunities to conduct scientific research</p> <p>2 a. Student demand for faculty-mentored research opportunities increases</p> <p>b. Students demonstrate positive attitude toward chemistry and biology</p> <p>c. Students participate in science related activities</p> <p>d. Students continue in research during academic year</p> <p>e. Students express understanding of what it means to do chemistry</p> <p>3 a. Faculty-student teams acquire and prepare data for grants, presentations and publication</p> <p>b. Research is continued by teams during the academic year</p> <p>c. Faculty obtain external funding</p> <p>d. Students and faculty publish research results</p> <p>e. Students and faculty present talks at meetings</p> <p>f. Students pursue post-graduate work in science related fields</p> <p>g. Students excel in academic and professional pursuits</p> <p>4. a. Program becomes implemented in other departments and other universities</p> <p>b. Faculty outside of W&M ask for information/material about program</p> <p>c. Faculty become active in effort to diversify science</p> <p>d. Information about the program is shared in science education publications and presentation</p> <p>e. Science education funding; funding for increasing diversity in the sciences is awarded to participants</p>	<p>1. a. Survey of attitudes matched with performance</p> <p>b. Grades on tests/exams</p> <p>c. End of program questionnaire</p> <p>d. Focus group</p> <p>e. Assessment of tutors</p> <p>f. Annual student updates</p> <p>g. SURE/CURE</p> <p>h. Annual mentor reviews</p> <p>i. Self evaluations</p> <p>2. a. Applications for HHMI and other experiences</p> <p>b. Pre and post questionnaire</p> <p>c. Interview</p> <p>d. Focus group interviews</p> <p>e. W&M tracking of undergraduate research</p> <p>f. Registrar records</p> <p>g. Tracking data from W&M HHMI online system</p> <p>h. Student and faculty descriptive narratives</p> <p>3. a. Multiples questionnaires</p> <p>b. Faculty and student publications, presentations, grant funding</p> <p>d. Performance review</p> <p>f. CVs</p> <p>g. Funder's reports</p> <p>h. Student academic and professional awards</p> <p>4. a. Publications, grant funding</p> <p>b. Citations of publications</p> <p>c. Invited talks on both science and pedagogy</p> <p>d. Undergraduate long term tracking e.g. PhD programs entered</p> <p>e. Collaborations outside of W&M</p> <p>f. Activity on the W&M/HHMI website</p>	<p>Evaluation questions are ranked in order of how quickly an effect is expected to be seen. However data for all outcomes will be collected simultaneously.</p>