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

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

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**SCHOLARSHIPS TO TAKE SUMMER INTRODUCTORY CHEMISTRY COURSE**