

DRAFT: HHMI CURRICULUM DEVELOPMENT : UPPER LEVEL ECO-DEVO COURSE

Inputs	Strategies	Outputs	Outcomes		Impacts (Long Term-Conditions)
			(Short Term-Learning)	(Medium Term-Action)	
<p>Undergraduate Students</p> <p>Curriculum Development Teams (Faculty, Instructors, Postdoctoral fellows, and Graduate and Undergraduate Students)</p> <p>Biology Faculty</p> <p>Environmental Science Faculty</p> <p>New Scientific/Pedagogical Discoveries</p> <p>Teaching and Research Laboratories</p> <p>Equipment and Supplies (software)</p> <p>Institutional Commitment</p> <p>Supportive Teaching and Research Environment and Infrastructure: Teaching Seminars/Workshops/Lunch Meetings</p> <p>Charles Center Teaching Mentoring</p> <p>Faculty Release Time</p> <p>Graduate Teaching Assistants</p> <p>Department Curriculum Review Opportunities/External Review</p> <p>HHMI – Staff, Leadership and Funding</p> <p>Other Funding Sources</p>	<p>Review of strategies and resources by interdisciplinary faculty committee composed of ecologists and cell-molecular developmental biologists, ongoing as course/lab is developed</p> <p>Continued interaction among Biology and Environmental Science faculty as lab is developed : for faculty buy-in and input</p> <p>Use of material from freshmen phage lab to provide continuity of research experiences</p> <p>Dovetail with faculty research efforts/programs to ensure continuity</p> <p>Provide training opportunities and resources for faculty, lab coordinators, and graduate and undergraduate teaching assistants</p> <p>Provide for faculty release time</p> <p>Provide teaching assistants for new lab</p> <p>Provide training and support for others such as undergraduates, graduate students, and postdocs engaged in curriculum development efforts</p> <p>Update equipment needed for new lab</p>	<p>An upper level laboratory course providing a real research experience examining the effects of mercury on embryonic development for 15 students each year</p> <p>Development of course materials for the new courses, including powerpoints, problem sets, flexible online lab manual, tutorials</p> <p>Faculty and instructors (lab coordinator and grad students) develop new skills in proteomics and genomics</p> <p>Other Biology and Environmental Science faculty develop interest in employing these new interdisciplinary techniques in their teaching and research</p>	<p>Students have better understanding of connections between ecology and molecular developmental biology ; deeper understanding of integrative biology</p> <p>Students have deeper understanding of integrative biology</p> <p>Students have ability to apply integrative approaches to wide range of scientific questions</p> <p>Faculty Lab development activities have positive impact on curriculum developers and those who implement it -- longer range they implement these integrative strategies in other courses and in research</p> <p>Students demonstrate more interest and engagement in scientific research, in particular fusing ecology with molecular biology</p> <p>Implementation leads to new collaborations among involved faculty</p>	<p>Students remain engaged in science activities particularly at interface of ecology and molecular biology; they remain in science majors</p> <p>More students take both ecology/environmental courses and molecular cellular courses</p> <p>Students demonstrate better understanding of material in upper level courses at all levels of biological organization</p> <p>Students demonstrate stronger performance in related biology courses and labs</p> <p>Faculty receive recognition for input of new course into curriculum and teaching new course with reduced workload in other areas</p> <p>Faculty continue to be involved in modifying or developing courses with less or no HHMI support</p> <p>Institutionalization of the new course</p> <p>Additional faculty become involved in course development using this courses as a model; Faculty use this course as paradigm for introducing integrative approaches fusing organismal/population biology with cellular-molecular biology</p> <p>Faculty use this course as paradigm for implementing “continuation” labs so that freshmen involved in research can continue their projects</p>	<p>Students enter interdisciplinary and integrative graduate programs or professions</p> <p>Students employ integrative (molecule to metapopulations) approaches in future science endeavors</p> <p>Faculty and instructors continue to modify what and how they teach science, in particular introducing many more new courses that involve integrative approaches</p> <p>Faculty develop a freshmen-through-senior systems-based curriculum, expanding opportunities at all levels of the curriculum</p> <p>Faculty members disseminate this approach outside of W&M</p> <p>Faculty receive recognition, awards, tenure, promotion for their efforts; Institutions reward faculty for novel teaching and curriculum development activities</p> <p>Institutions commit funds and other similar support for interdisciplinary curriculum revision</p>

DRAFT: ECO-DEVO COURSE EVALUATION FRAMEWORK

Evaluation Questions for OUTCOMES		Possible Data Collection Methods and Information Sources	Rank/Priority (include brief rationale)
<ol style="list-style-type: none"> 1. 2. How effective was course in teaching eco-devo, in particular teaching an integrative approach to scientific questions ? 3. Did the students' attitudes towards integrative biology, in particular eco-devo change for the positive? 4. How effectively did the students employ these approaches beyond the course? 5. What was the effect of this course on the biology and environmental biology curricula? 6. What impacts were there beyond the college on curriculum development activities? 	<ol style="list-style-type: none"> 1. <ol style="list-style-type: none"> a. Students show increased interest in melding ecology and development b. Students learn basic ecology and development and molecular cell biology concepts better and retain material long term c. Students value integrative approaches d. Students less taking biology courses outside of their field e. Students continue in interdisciplinary biology (majors and careers) and continue taking courses that cross disciplines e.g. evo-devo, molecular ecology 2. <ol style="list-style-type: none"> a. Students value interdisciplinary approaches b. Students willing to take courses outside of their comfort zone c. Students seek out integrative courses d. Students recommend eco-devo courses to friends 3. <ol style="list-style-type: none"> a. Students take additional courses that bridge ecology and molecular development b. Students pursue research opportunities that bridge ecology and development or ecology and molecular biology c. Students employ integrative approaches in other courses and in their research projects 4. <ol style="list-style-type: none"> a. Course integrated into curriculum b. Course enrollment increases c. Number of students pursuing integrative approaches increases d. Biology Dept creates additional courses modeled on this course e. Faculty employ similar approaches in their research program 5. <ol style="list-style-type: none"> a. Courses in other departments create similar integrative approaches b. Impacts science pedagogy at College c. Additional curriculum development grants and awards that stress quantitative and modeling approaches d. Other departments and interdisciplinary programs create upper level courses that are extensions of this course and build upon it; new multidisciplinary courses created 	<ol style="list-style-type: none"> 1,2. <ol style="list-style-type: none"> a. Pre-Post Tests b. Entrance and Exit Questionnaire c. Interview d. Focus Group e. CURE f. Course/Classroom Observations g. Course Surveys 3. <ol style="list-style-type: none"> a. Data collection on course/curriculum changes (e.g., Enrollment for students) b. Student data for independent research activities 4. <ol style="list-style-type: none"> a. Data on offerings in curriculum and departmental major b. Interviews/reports from faculty and other curriculum developers c. Focus Group of faculty and other curriculum developers d. Faculty CVs and portfolios 5. <ol style="list-style-type: none"> a. Review of course offerings, syllabi, and catalogs for research based courses b. Review of teaching workshop topics and teaching seminars c. Assessment of teaching on P&T d. Faculty CVs and portfolios e. Annual report of HHMI-funded activities and their impact f. Grant funding information g. Institutional funding reports 	<p>Items are ranked based on how soon they can be captured during and after program activities (strategies) have occurred. However all questions and measures will be evaluated during and after each activity in order to capture the ongoing, longer-term changes in impact. That is, we expect to see increasing impact over time.</p>