The Department of Biology consists of 11 faculty (10 tenure-track), ca. 15 PhD students, and 15 MS students in any year. We are organized into research groups that function as Communities of Effective Practice. Much of our research takes place over the summer on campus.

Biomechanics
Work with laboratory or class research
Interact with students and scientists at
Design research and problem solve when the first
Conduct biological research as part of a field
Find relevant literature

hypotheses
Conduct a short empirical research project
Implementation/Enactment Phase
Evaluate my research with an
teach those who have lesser expertise than my own
Present visual display of research or system
Classroom interactions in which research is
Present my research in ways that will interest those
Exploration Phase
Explore the varied scientific disciplines
Understand the nature of the scientific process of formulating and addressing questions
understand the importance of collaborative work, and the value of using diverse approaches to attack a single problem
Read and discuss scientific papers, to see the scientific method in action
Interact with students and scientists at all levels (graduate students, faculty, visiting speakers)
Relate studies to real-world phenomena

LEEP Learning Outcome 2. Intellectual and Practical Skills
Key intellectual skills for biologists include reading, comprehending and discussion of primary research literature, formulating hypotheses and designing empirical approaches to evaluating them, analysis and interpretation of data, and writing summaries of research projects. Practical skills incorporate a wide variety of technical methods, with the common elements of writing, graphic and oral presentation of data.

LEEP Learning Outcome 5. Capacities of Effective Practice
Effective practice, for academic biologists, includes conducting original research and presenting the results in written or oral form, transmitting basic principles to students and promoting further inquiry within the discipline. For non-academic biologists, effective practice may entail generating or interpreting data needed to formulate policy, designing experiments for clinical trials, devising medical procedures, diagnosing health disorders, or designing pharmaceuticals, to name only a few of many possibilities.

Next Steps
1. Develop a rubric-based system for uniform assessment of key projects within a portfolio storage and access system, coordinated with a database for efficient assessment analysis.
2. Develop the SURE (Summer Undergraduate Research Experience) program to further enhance connections within the Department and ultimately, among departments.

LEEP Learning Outcome 2. Intellectual and Practical Skills
Student Behavior
Orientation Phase
• Explore the varied scientific disciplines
• Understand the nature of the scientific process of formulating and addressing questions
• understand the importance of collaborative work, and the value of using diverse approaches to attack a single problem
• Read and discuss scientific papers, to see the scientific method in action
• Interact with students and scientists at all levels (graduate students, faculty, visiting speakers)
• Relate studies to real-world phenomena
• Understand the value of interactive, cooperative research by reading selected published papers
• Appreciate the connection between science and real-world issues by exploring the links
• Engage with students who are already working in faculty laboratories
• Participate in focus groups that delve deeply into specific topics

LEEP Learning Outcome 5. Capacities of Effective Practice
Student Behavior
Orientation Phase
• Understand the value of interactive, cooperative research by reading selected published papers
• Appreciate the connection between science and real-world issues by exploring the links
• Engage with students who are already working in faculty laboratories
• Participate in focus groups that delve deeply into specific topics
• Present to peers and professors, Design and complete short class-based research project
• Conduct biological research as part of a field program
• Conduct field research relevant to community needs
• Engage in internship

Exploration Phase
• Work in groups to solve problems (POGIL)
• Conduct a short empirical research project
• Summarize a sample graphically
• Interpret graphs
• Perform statistical tests
• Find relevant literature
• Present results orally and in writing
• Peer review of class work
• Classroom interactions in which research is designed
• Group discussion of complex published papers
• Projects that include scientists and non-scientists
• Meetings with stakeholders about applications of ideas

Implementation/Enactment Phase
• Work with laboratory or class research group on long-term research project
• Participate in analysis and interpretation of data
• Complete literature search relevant to research
• Participate in collaborative writing of a manuscript for publication
• Teach those who have lesser expertise than my own
• Work out the answers to many questions but I know when it is appropriate to ask those with more knowledge than I have
• Present my research in ways that will interest those with different perspectives
• Presentations to younger students and lay audience

LEEP Learning Outcome 5. Capacities of Effective Practice
Exploration Phase
• Engage with students who are already working in faculty laboratories
• Participate in focus groups that delve deeply into specific topics
• Peer review of class work
• Classroom interactions in which research is designed
• Group discussion of complex published papers
• Projects that include scientists and non-scientists
• Meetings with stakeholders about applications of ideas
• Internships

Implementation/Enactment Phase
• PLA experience
• Mentoring of earlier stage students in the laboratory
• Reports for conservation and other agencies
• Completing and publishing a manuscript with others
• Reviewing and editing manuscripts for a Clark Biology Journal
• Collaborative writing of a textbook chapter

Biology Communities of Effective Practice
Each of our research groups comprises a community of effective practice, nested within a larger collaborative community within the Department. Interactions among the laboratory-based CEPs are especially effective because graduate and undergraduate students share ideas and methods, enhancing connectivity within the department. Some CEPs also have forged significant connections among departments and to the community.

Research Topics Explored by these Communities include:
Algal Physiological Ecology
Anti-Cancer Drugs
Developmental Neurobiology
Environmental Microbiology
Epigenetics in Social Insects
Genomics of fungi
Herpetology & Biomechanics
Fungal Tree of Life
Invasive Mosquitoes
Stream Conservation
Stickleback Adaptive Radiation

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