theses. Students also survey the papers' authors with questions of their own design; the responses provide insight into the individual experiences and motivations of active scientists at various stages of scientific careers. We have tested modules focused on planaria regeneration and on optic nerve development. Our assessments indicate that CREATE students learn to critically analyze data and also gain new understanding of, and interest in, the research process and scientists themselves. Thus, CREATE humanizes research and researchers as it demystifies the process of reading/analyzing a scientific paper. We suggest that the approach could be adapted for many content areas, and help to stimulate students' interest in research careers.

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Program/Abstract # 77
Undergraduate cell and developmental biology laboratory designed to increase student learning of transfection of cultured cells with GFP plasmids

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Training in cell and developmental biology requires a wealth of academic and practical experience. We have designed a 2- to 3-week laboratory sequence that integrates cell culture, transfection of green fluorescent protein (GFP) plasmids, and studying and visualizing cells in mitosis with fluorochrome-tagged antibodies using immunofluorescence microscopy. These experiments reflect current research investigations performed by actual scientists. Students work in teams to culture HeLa cells on glass coverslips, transfect them with one of two plasmids to demonstrate cytoplasmic (pEGFP-N1) or nuclear (COUP-TFI-GFP) localization. The cells are fixed 24 h after transfection before immunocytochemical methods are used to label the mitotic spindle with anti-tubulin and anti-aurora B antibodies followed by fluorochrome-tagged secondary antibodies. The essential role of tubulin in the cell cycle is reinforced as the students have the thrill of labeling the apparatus themselves. Furthermore, they have the opportunity to investigate the mitotic process in greater depth by examining the expression pattern of other players in mitosis such as aurora B, which mediates chromosomal segregation and cell cycle regulation. These exercises provide the basis for development of inquiry-based projects and can easily be expanded into student research projects. We will discuss assessment and student posed hypotheses, results and interpretations.

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Program/Abstract # 78
The group investigation course: Transitioning undergraduates into research in developmental neurobiology

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The value of undergraduate research is well documented, but transitioning from learning science via traditional lecture courses to doing productive and original experiments can be challenging. To facilitate this transition we developed a practical research course that emphasizes microscopy and imaging skills using techniques such as time-lapse and confocal microscopy that cannot be taught in traditional lab sessions. The course enrolls six undergraduates who collaboratively approach an original research question in developmental neurobiology. The course also includes instruction on literature searches, keeping lab notebooks, documenting protocols, analyzing data, and presenting results in written and oral formats. Class meetings are structured as lab meetings and journal clubs with students taking responsibility for planning and executing their research. Brief, weekly e-mail writing assignments help students reflect on lessons learned and questions raised in the research process. Students individually master specific techniques while the class collaborates to answer an original research question such as determining the developmental expression of a protein, investigating factors that influence neuronal morphology, or examining growth cone dynamics. This group approach allows research projects that are more ambitious and satisfying than what individual students accomplish independently. Evaluations indicate that this course effectively provides students with opportunities to engage in original scientific research, master advanced techniques, develop confidence, learn the value of collaboration, and stimulate continued interest in research.

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Program/Abstract # 79
Enlarging contexts: Enhancing learning in Developmental Biology using web conferencing in the classroom

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A core focus of many biology courses is to teach students to critically think about the subject matter. In my BIO346, Developmental Biology Lecture course I have 5 main pedagogical goals for student learning. (1) Convey main concepts of Development, (2) foster appreciation for the research behind those concepts, (3) build proficiency in science communication, (4) enhance critical thinking, and (5) provide an environment that invites students to be intellectual contributors to the field of Development rather than bystanders peering in. Web conferencing provides one way to achieve all of these pedagogical goals. In my course, students are assigned key research articles to critically analyze and present in class. Use of a simple web camera and internet access enables students to then participate