Geophysical Research Abstracts
Vol. 12, EGU2010-12712, 2010
EGU General Assembly 2010

Instructing high school students in forensic environmental science using Brownfield Action

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Barnard College and Columbia University's Center for New Media Teaching and Learning's Brownfield Action is a digital web-based, interactive simulation that combines lecture, laboratory exercises, and individual and collaborative out-of-classroom assignments. The objective of the instruction is to locate and define a subsurface plume of gasoline whose point source is a leaking underground storage tank (LUST) at a gas station. In the fall of 2009, fifteen pre-college high school students from the five boroughs of New York City used Brownfield Action in a 12-week after-school enrichment program at Barnard to investigate the gasoline plume using a variety of geophysical methods – excavation, ground penetrating radar, magnetic metal detection, soil gas, and drilling. The investigation resulted in individual Phase One Site Assessment Reports about the LUST. As coordinators and instructors of the program, we will share our experience teaching the students and the advantages and challenges of using a digital simulation as an instructional centerpiece. Such instruction is intended to include civic engagement and responsibility as part of science education and to create a curriculum that, instead of relying on fragmented and abstract instruction, provides students with a realistic, inquiry-based, and interdisciplinary construction of knowledge.