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Brownfield Action III - Modular use of hydrogeology instruction in the virtual classroom

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Brownfield Action III (BA III) is a network-based, interactive, digital space and simulation developed by Barnard College and the Columbia Center for New Media Teaching and Learning in which students explore and solve problems in environmental forensics. BA III is a proven inquiry-based approach to teaching and learning that, since its inception in 1999, has been recognized as an exemplary curriculum. Indeed, in 2002 it was selected as a national model curriculum by SENCER (Science Education for New Civic Engagements and Responsibilities). BA III provides instruction in environmental site assessments and in the remediation of former industrial sites (brownfields) for secondary and higher education students. The initial full-semester, three hours of weekly laboratory instruction that complements lectures in BA II has been revised for modular use in Hydrology, Environmental Science, and Environmental Ethics undergraduate and graduate courses in the United States. The remediation of brownfields is important because they have potential as recreational, residential, and commercial real estate sites. As part of determining the value of such a site, an environmental site assessment (ESA) is required to determine the nature and extent of any contamination. To reach that objective, BA III contains a narrative that is embedded and to be discovered in simulation; it is a story of groundwater contamination complete with underground contaminant plumes in a fictitious town with buildings, roads, wells, water tower, homes, and businesses as well as a municipal government with relevant historical documents. Student companies work collaboratively in teams of two, sign a contract with a development corporation to conduct a Phase One ESA, receive a realistic budget, and compete with other teams to fulfill the contract while maximizing profit. To reach a valid conclusion in the form of a professional-level ESA and 3-D maps of the physical site, teams construct a detailed narrative from diverse forms of information, including socio-historical and a scientific dataset comprised of over 2,000,000 data points. BA III forces students to act on their perceptions of the interlocking realms of knowledge, theory and practical experience, providing an opportunity for them to gain valuable practice at tackling the complexity and ambiguity of a large-scale, interdisciplinary investigation of groundwater contamination and environmental forensics.