

# SASEE: Science Attitudes & Self Efficacy Evaluation

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A common goal of educators is to make meaningful connections between science concepts and daily life, bringing relevancy to science. Brooklyn College's GK-12 initiative, *City-as-Lab*, utilizes the city's parks and other outdoor spaces as laboratories and sources of relevant scientific investigations for five New York City public schools participating in the Small School Initiative. GK-12 Fellows bring their individual research expertise into the classroom, including the disciplines of psychology, archaeology, biology, chemistry, geology, and physics. Additionally, psychology Fellows are collaborating on a multi-school study exploring the effects of place-based and inquiry-based learning. The Science Attitudes & Self Efficacy Evaluation (SASEE) compares student efficacy in science, student attitudes toward science, and student environmental attitudes between classrooms with and without a GK-12 presence. Using SASEE, the psychology Fellows have uniquely integrated their work into the classrooms to create a unifying investigative collaboration between themselves, the physical science Fellows, the participating GK-12 teachers, and students in answering the simple question: What is effect of the *City-as-Lab* on students in the science classroom?

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Nick DiFrancesco has integrated skills and knowledge from the field of geology to projects at Teacher's Preparatory; the projects have revolved around local resource conservation and sustainability. In the attempt to appeal to broader student interests in science, Nick has engaged students with questions of public health, social justice, and community stewardship to make them more aware of their choices and actions to evoke an awareness and attitude shift on environmental issues and attitudes towards science.



Michael Magee has integrated social and cognitive psychological constructs and methodologies into projects and classroom activities. In the context of a spatial thinking unit, as we worked toward learning about geo tagging and plotting in geospatial software, such as My World GIS, I introduced my students to some concepts from cognitive psychology related to our memories function. Integration of social and cognitive psychological concepts and methods has expanded the scope of our project and enhanced both enjoyment and knowledge gained from the experience.

Kim Handle has integrated her knowledge of paleoecology several cross-class research projects in an Urban Ecology class revolving around local ecology issues and urban sustainability. Research investigations at AUP have included topics of the carbon cycle, public health, food deserts, and urban resources. Creating projects that utilize the local environment help to bring relevancy to their work in the classroom & foster a greater sense of community social justice.

Mark Kanner's work in environmental physics gives him a solid background to contribute to projects in the classroom involving physical processes. For instance in the EATS class at Teacher's Preparatory on urban gardening he helped students design and test different types of cold hoops for growing crops. The process of designing an apparatus gave the students ownership of the project, and potentially bolstered their interest in science.

As a graduate student of chemistry, Reena Rahi, has integrated her knowledge of chemistry and its role in the community into weekly classroom activities, as well as into year-long projects. At ITAVA Reena designed a project where students learned about the adverse effects of air pollution on Brooklyn residents by determining their lung capacity using the FEV1 (Forced Expiratory Volume in the first second) meters. Students also learned about the causes of air pollution, as well as ways through which they can decrease air pollution by making changes to their daily lives therefore influencing change in student attitudes of science and science relevancy.



Adam Johnson's work in social psychology focuses on understanding people's political beliefs and attitudes, as well as the reasons why people tend to be resistant to changing those beliefs and attitudes. He has used this knowledge of attitude formation and change to make students more aware of their own attitudes toward the environment, more conscious of the decisions they make regarding their urban environment, and more effective in creating intervention projects in their school that cause others to think and behave in environmentally friendly ways. By encouraging students at AUP High School to be agents of change and by teaching them about evidenced-based tools for affecting change, students have been able to see how the behavioral sciences relate to their every day life as well as to larger environmental issues.



Sheila Nightingale is an Archaeology PhD candidate in the Anthropology Department. Her work focuses on the stone tool technologies of the African Middle Stone Age, around the emergence of modern *Homo sapiens* and the use of geographic information systems (GIS) to model and display spatial and temporal data. Interests in change over time and how change may be visually analyzed inform much of the work at Science, Technology, and Research (STAR) Early College High School, as students examine various interactions between human, floral, and faunal communities, and the earth systems of a public green space, increasing student engagement and interest in the natural sciences and their place within them.

Anna Petrovicheva's research on interaction between plants and a pathogen, *Agrobacterium tumefaciens*, the cause of Crown Gall disease, involves knowledge of both botany and microbiology. Both of these have been included in her work with BASE students through teaching them microbiology techniques in AP Biology and Living Environment, and a longer project on Ethnobotany with both of the Science Research classes. These lessons fueled the interest students to do outside research and engage in discussions on the topic outside the lesson time.

As part of our initiative to engender and increase science interests in students, Kendall Eskine has incorporated a variety of experiential learning projects into the classroom at BASE High School. Drawing from his research in social cognition, he has worked closely with students to design and implement experiments ranging from food preferences to emotion induction & moral judgments to behavioral economics. Kendall uses this research to demonstrate the breadth and scope of science-appropriate topics to students & instill science interests by making the content relevant.



Jesse John, Geology graduate student, has developed a project that introduces students to authentic, research-based experiences in which they collect data and perform geospatial analysis using GPS and GIS. This study focuses on the effects of road salt pollution in Brooklyn's largest public park. Students at STAR High School are able to examine annual fluctuation of salt pollution and its influence on the environment. GK-12 Fellows collaborate with teachers to tailor a project that elicits relevancy in the science but also to: 1) meet National and NY State science standards; 2) provide the appropriate academic rigor for high school students; and 3) find inexpensive and sustainable tools and resources for chemistry and earth science education.

