

**ASTROBIOLOGY IN AN URBAN NEW YORK CITY HIGH SCHOOL: JOHN DEWEY HIGH SCHOOL'S SPACE SCIENCE ACADEMY.** Barry Fried and Honora B. Dash, John Dewey High School 50 Avenue X, Brooklyn, New York, 11223 bfried@schools.nyc.gov, hdash@schools.nyc.gov

**Introduction:** At John Dewey High School, an innovative urban school, Astrobiology is the unifying theme of our Space Science Academy (SSA) - a sequence of classes consisting of Comparative Planetology, Mission Design Challenges, Astrobiology and Remote Sensing. Our course of study integrates biological and physical sciences through the study of planetary science using a series of inquiry-based activities, projects and challenges. We are an inner-city school with 3,000 students of diverse multi-ethnic populations and a variety of economic backgrounds. Our school population consists of 30.6% African-American, 14.6% Caucasian, 20.8% Hispanic and 33.4% Asian students. In addition, 420 of our students are English Language Learners (ELL) and 300 receive Instructional Support Services (have IEPs). This all-inclusive program allows students to explore scientific concepts, and the course offers them a venue for investigating the same fundamental ideas and concepts and use of technology that scientists and researchers use in their professions, as well as an opportunity to become future members of the scientific community.

**Discussion:** We recruit a broad spectrum of students for the Academy, with diverse learning styles, such as students with IEPs, ELL students and underserved populations. Throughout this course of study, students simulate NASA's team-work method to problem-solve, explore and engage in the process of discovery and research. We increase student interest and achievement in understanding science concepts through STEM initiatives, team-building activities and oral and written communication projects, where they apply concepts of biological and earth system sciences. By adding the collection and interpretation of live data and integrating relevant technologies, students engage in teamwork, journal-writing and presentation of their findings related to space mission science and the quest for life in the universe, to classmates, other schools around the country and mission scientists.

Our Space Science Academy students participate in the Mars Exploration Student Data Teams (MESDT) program sponsored by Arizona State University (ASU). We are one of a select few schools in the United States to be part of this project. Our students work with scientists participating in the Mars mission and with data from the Compact Reconnaissance Imaging Spectrometer (CRISM) onboard the Mars Reconnaissance Orbiter (MRO). The students analyze the surface history and geomorphology of the Martian terrain using visual and

infrared images to determine the most likely area for future missions to explore the possibility of the existence of water and, therefore, the possibility of life. They are also involved with NASA's Digital Learning Network (DLN), learning flight and glider principles to take on creative challenges and to demonstrate and share their findings and projects to NASA flight specialists and student teams across the country through video-conferencing.

The collaborative learning approach used in this program simulates the NASA method of problem-solving as students work in teams to learn about, explore and participate in the discovery aspects of science research. This method ensures that all students participate and have an equal stake in the outcome of the projects. Space exploration has its own unique needs and its own dynamics. Our Space Science Academy classes are interdisciplinary in the true sense of the word. We not only include STEM subjects, but other disciplines such as art, history and music. Students learn to recognize the complexity of certain tasks as they explore many topics and apply concepts of biology, chemistry, physics, astronomy, geosciences, sociology, ethics and psychology to myriad activities, projects and challenges.

Our staff is highly qualified to teach in this program. One of our teachers was selected as teacher leader in Astrobiology for New York State and provides professional development workshops to show educators how to incorporate Astrobiology into their classrooms. Two staff members have been selected as Solar System Educators (SSEP) for New York State through NASA/JPL and lead teacher training sessions to help educators integrate NASA Mission Space Science into existing science curricula. Workshop leaders highlight inclusion teaching methodologies with an emphasis on reaching varied grade-level and experiential-level audiences.

**Summary:** Our approach to student learning is to foster an all-inclusive student-centered learning environment and the class is collaboratively team-taught. We encourage participation by under-represented populations and we address all learning modalities based upon the students' strengths and abilities as they relate to the variety of required learning activities. The use of live data and integration of technology into the classroom allow students the opportunity to engage in, experience and apply scientific knowledge that we hope will lessen the achievement gap and increase the

interest level for all students, especially the underserved student groups, inspire them to continue on to higher level education, and help pave their way to become better citizens of science as they pursue a career in space science.

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