

Elementary & Secondary Education

Science, Engineering, Mathematics, & Aerospace Academy

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PROGRAM DESCRIPTION

SEMAA is an innovative, national project designed to increase the participation and retention of historically underserved and underrepresented K-12 youth in the areas of Science, Technology, Engineering, and Mathematics (STEM). The project currently operates from 13 sites located throughout 11 states and the District of Columbia. Site locations include Historically Black Colleges and Universities (HBCU), Hispanic Serving Institutions (HSI), Tribal Colleges and Universities (TCU), science centers, museums, and elementary/secondary schools.

The project features the following three (3) innovative core components:

- *A Hands-on, Inquiry-Based, Set of K-12 STEM Curriculum Enhancement Activities* that is aligned to national math, science and technology standards and encompasses the research and technology of each of NASA's four mission directorates (Aeronautics Research, Exploration Systems, Science, and Space Operations). These unique NASA courses provide NASA SEMAA graduates with 441 hours of advanced studies in STEM prior to enrollment in a post-secondary institution.
- *An Aerospace Education Laboratory (AEL)* which actively engages students in real world challenges involving cutting-edge NASA technologies inside an onsite NASA laboratory/facility; and
- *The Family Café* which Empowers parents/caregivers with vital STEM education and pre-college planning information to guide their children's journey into the STEM workforce.

PROGRAM RELEVANCE TO NASA

NASA is working strategically to address the Agencies critical need for STEM professionals through its portfolio of educational investments for students in grades kindergarten through Ph.D. The SEMAA Project is one of NASA's investments focused on NASA Education Outcome II: To Attract and Retain Students in STEM Disciplines.

PROGRAM BENEFITS TO SOCIETY

STEM literacy has moved to the forefront of America's agenda, playing a vital role in our national security and economic interests. Students in STEM fields provide the workforce for important military, government, and industry jobs, as well as supply the great thinkers needed to maintain U.S. leadership in technology and innovation. Educational research makes clear that the United States is facing a critical shortage of young people prepared to enter the STEM fields, calling into question America's position within the global economy of the next generation.

In their report, titled Science and Engineering Indicators, the National Science Board pointed out that African Americans, Hispanics, Native Americans, and persons with disabilities make up 24% of the population, but only 7% of the science and engineering workforce; representing the biggest gap in the U.S. STEM workforce. The report went on to say that if women and minorities participated in the science and engineering workforce proportional to their presence in the general population, there would be no U.S. talent gap.

In recent years, NASA SEMAA has emerged as a nationally renowned leader in K-12 STEM Education; inspiring, engaging and educating over 288,000 K-12 students, parents/caregivers and teachers during the past four years. By harnessing the collective resources of NASA, institutions of higher education, science centers, museums and primary/secondary schools, SEMAA is working to bridge the education gap for historically underrepresented K-12 youth in STEM.

In addition to the direct participant services offered, SEMAA has worked collaboratively to strengthen the national K-12 STEM pipeline by linking SEMAA students to 50+ other STEM projects/programs during the 2007 fiscal year; thus increasing students' exposure and interest in STEM and maximizing the nation's overall return on investment in K-12 STEM education.

In recent years, the NASA SEMAA has solidified a foundation for systemic services to K-12 students and families that is serving as a catalyst for broader STEM education efforts in the schools, communities, and throughout the states in which the project resides. Just a few examples of STEM education investments inspired by SEMAA include:

- Creation of new, STEM-focused Bachelor Degree programs at select colleges and universities;
- Development of Pre-College STEM Divisions in institutions of higher education;
- Creation of over 30 NASA SEMAA STEM schools/academies;
- Implementation of STEM focused Parent Centers in schools; and
- Integration of high school STEM curriculum modules as required science courses in public schools across the nation.

PROGRAM GOALS

The NASA SEMAA project has three primary goals which are related to the project's mission and support Outcome II of the Agency's Strategic Coordination Framework.

- Inspire a more diverse student population to pursue careers in STEM-related fields.
- Engage students, parents/caregivers and teachers by incorporating emerging technologies.
- Educate students utilizing rigorous STEM curricula, designed and implemented as only NASA can.

PROGRAM ACCOMPLISHMENTS

Major accomplishments for the NASA SEMAA project over the last three years include:

- In May 2008, the National SEMAA Office was informed by the Office of Human Capital Management that NASA SEMAA had been selected to receive NASA's coveted Group Achievement Award.
- In September 2007, the Harvard University John F. Kennedy School of Government's Ash Institute for Democratic Governance and Innovation presented NASA SEMAA with a *Finalist Award for the 2007 Innovations in American Government Award Competition*. With this award, NASA SEMAA was recognized as one of top eighteen, innovative government programs in the nation; placing SEMAA in the highest 2% of applicants from the federal, state and local governments. As a finalist, NASA SEMAA appeared in a *USA Today* article entitled "Best and Brightest in the USA" and was awarded a \$10,000 grant to be directed toward the dissemination and replication of project innovations. Of special significance is the fact that NASA SEMAA was the only educational initiative to be recognized at this level of this prestigious competition.
- In September 2007, the Congressional Black Caucus (CBC) wrote SEMAA into history via a congressional record; in which the CBC honored and congratulated SEMAA as "one of the nation's premier K-12 STEM educational programs."
- During fiscal year 2007, SEMAA sites collaborated with a network of 200+ partners and leveraged over \$3.8 Million in funds (including both financial and in-kind support), constituting more than a 100% match to the total project budget provided by NASA.

STUDENT ACCOMPLISHMENTS

Today America is realizing the return on its investment in the NASA SEMAA Project. Now in its 14th year of operation, the first NASA SEMAA students are beginning to graduate from college with STEM degrees and take their place in the STEM workforce. Work is underway working to develop a reliable student tracking system that will enable project administrators to accurately report on the progress of former NASA SEMAA students. The information below reflects student highlights and data collected by a handful of NASA SEMAA sites that maintained their own internal tracking.

- There are currently 262 NASA SEMAA graduates are currently attending an accredited institution of higher learning pursuing a STEM degree.
- Since 2007, there have been 33 NASA SEMAA graduates who have received a STEM degree and are currently employed in the STEM Workforce.
- Over 255,113 K-12 students served during the past four years (representing 8,066 elementary, middle, and high schools).
- In FY-2007, NASA SEMAA students help fill the nation's STEM pipeline by participating in over 50 STEM-focused educational programs and projects including: NASA's Great Moonbuggy Race, the Team America Rocketry Challenge, the ARLISS/CanSat project, and several NASA design challenges.