

NASA Science, Engineering, Mathematics and Aerospace Academy (SEMAA)

Administered by: Paragon TEC, Inc.

Type of Agreement: Contract

Project Manager: Richard L. Gilmore

John H. Glenn Research Center

(216) 433-5493

PROJECT DESCRIPTION

The NASA Science, Engineering, Mathematics and Aerospace Academy (SEMAA) is a national education 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).

SEMAA delivers three core components: a set of hands-on, minds-on K-12 STEM curriculum enhancement activities, a state-of-the-art Aerospace Education Laboratory (AEL), and an innovative Family Café.

The NASA SEMAA project currently operates at 14 sites located throughout 12 states and the District of Columbia. Site locations include community colleges, four-year colleges/universities, Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), primary/secondary schools, science centers and museums.

PROJECT GOALS

The goals of SEMAA are to Inspire a more diverse student population to pursue careers in stem related fields; Engage students, parents and teachers by incorporating emerging technologies; and to Educate students by utilizing rigorous STEM curriculum enhancement activities that meet national math, science and technology standards and encompass the research and technology of NASA's four Mission Directorates.

PROJECT BENEFIT TO OUTCOME (1,2, OR 3)

The SEMAA Project is directly aligned to Outcome II:

Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

In support of the OMB PART Process, SEMAA provided data which contributed significantly to the passing of 2008 PART. SEMAA is the only K-12 STEM project in the NASA education portfolio providing a seamless NASA pipeline for elementary and secondary age students, families and teachers.

In FY 2008, the SEMAA Project contributed to Outcome II with the following accomplishments:

- 57,394 Students, Parents/Adult Caregivers, Teachers and Outreach participants were served in FY 2008
 - 40,657 Total Students (18,894 Direct Students and 21,763 Indirect Students)
 - 173 with Special Needs and 49% of Direct Students were Female

- NASA STEM Pipeline Collaborative Activities
 - Fostered the participation of NASA SEMAA students in 50+ other STEM programs/projects, thus maximizing student exposure and interest in STEM and strengthening the national K-12 STEM pipeline
 - Participation in Moon Buggy Race, Team America Rocketry Challenge, DLN on ISS, Engineering Design Challenges, Lunar Plant Growth, AESP Workshops, NES
 - NES Family Involvement Support
 - Conducted Family Survey for INSPIRE Project

PROJECT ACCOMPLISHMENTS

APG 8ED04: Maintain, at FY 2007 levels, the number of elementary and secondary students participating in NASA instruction and enrichment materials

- FY 2008 student participant levels were maintained, and accomplished a 6.3% increase in Direct Student Participants

- E&S Education Leadership along with the Agency Project Managers developed a definition for “student participating in NASA instruction and enrichment materials” which now will incorporate SEMAA Indirect participants. The inclusion of these Indirect Student Participants increased the overall number of students participating in SEMAA in FY 2008 to 40,657 (18,894 direct participants and 21,763 indirect participants) compared to the FY 2007 baseline of 17,773 direct participants.

In FY 2008, SEMAA accomplished the following:

- Updated SEMAA data collection and reporting tools to ensure that critical SEMAA project data required to document SEMAA’s alignment to Education Outcome II is captured and recorded in a NASA approved database system.

- Leveraged ESMD funding to support ESMD Curriculum Integration into SEMAA. This special project will not only update the SEMAA curriculum with current ESMD content but it will also directly address one of the National Research Council (National Academies) recommendations for the SEMAA Project.

- Developed a SEMAA Evaluation Plan and supported the development of the Elementary & Secondary Education Evaluation Plan assessing the SEMAA Project and preparing SEMAA for a Third Party Evaluation in FY 2009.
- Developed a Marketing and Communications Plan along with a National Sustainability Plan to better equip SEMAA sites with tools to develop partnerships for sustainability.

Return on Investment:

Based on the data collected from the funded NASA SEMAA project sites...

- During FY-2008, there were 80 NASA SEMAA graduates attending an accredited institution of higher learning pursuing a STEM degree.
- During FY-2008, 9 NASA SEMAA graduates received a STEM degree from an accredited institution of higher learning.
- There are currently 27 NASA SEMAA graduates employed in the STEM workforce.

PROJECT CONTRIBUTIONS TO PART MEASURES

The SEMAA Project is aligned to PART Measure 1 and PART Measure 4

PART Measure 1: Percentage increase in the number of elementary and secondary student participants in NASA instructional and enrichment activities:

In FY 2007 SEMAA served 17,773 K-12 Direct Student participants. In FY 2008 the project served 18,894 direct students resulting in a 6.3% increase over FY 2007. Additionally, SEMAA served 21,763 Indirect Students for a total of 40,657 K-12 student participants in NASA instructional and enrichment activities.

PART Measure 4: Level of student interest in science and technology careers resulting from elementary and secondary NASA Education programs:

In FY 2008, 52% of respondents (5,359 out of 10,285) indicated plans to work in a STEM career choice after they completed their studies, representing a 2% increase over the FY 2007 result of 50%.

Additional Performance Measure Data:

In FY 2008, the SEMAA Project operated at a cost of \$44.48 per participant (Annual Budget = \$2,553,000M / 57,394 Total Participants). The target reduction for FY 2008 was 8.2%. SEMAA exceeded the 2008 target by 4.6% by achieving a reduction in cost of 12.8%. **(FY 2007 Result: \$3.281M / 64,296 Total Participants = a cost \$51.03 per participant)**

IMPROVEMENTS MADE IN THE PAST YEAR

SEMAA updated project data collection and reporting tools to ensure critical project data required to document SEMAA's alignment to Education Outcome II is captured and recorded in a NASA approved database system. SEMAA participated in Beta testing of the new Agency database and participated in the development and alignment of new questions for the new database.

In FY2008, SEMAA introduced Aerospace Education Laboratory (AEL) Remote Installation to its sites. This software is a new innovative tool that combines the latest in internet video conferencing with new virtual PC software to perform software upgrades to the (AEL) and to resolve various AEL related help desk issues in a timely and cost effective manner. Additionally, these innovative tools can be utilized to provide SEMAA classroom teachers and students with the means to collaborate on various distance-learning projects. This technology has transformed AELs in select locations to state-of-the-art, distance learning laboratories

PROJECT PARTNERS AND ROLE OF PARTNERS IN PROJECT EXECUTION

SEMAA sites are required to develop partnerships annually that will both enhance and sustain STEM project services beyond NASA funding. During fiscal year 2008, SEMAA leveraged over \$3.8 Million dollars in funds (including both financial and in-kind support) for K-12 STEM education, constituting more than a 150% match to the total project budget provided by NASA. SEMAA has leveraged over \$15 Million dollars in funding for K-12 STEM education from 2004 – 2008.

Roles and Responsibilities of SEMAA stakeholders and partners.

Organization	Responsibility
NASA HQ	Provides funding for the SEMAA Project.
NASA Glenn Educational Programs Office	Serves as the SEMAA Project Manager providing guidance and overall project management.
NASA Center Education Offices	Provide services to the SEMAA sites in their region.
NSO Contractor Paragon TEC, Inc.	Manages the National SEMAA Office (NSO); oversees the day-to-day operations of the SEMAA sites. Works with NASA to establish new SEMAA sites as well as installation of AELs.
NASA Glenn – On Site Contractor SGT, Inc./Paragon TEC, Inc.	Support Service Contractors who support the project management efforts of the SEMAA project.
SEMAA Sites	Deliver the SEMAA project to students, families, and teachers. Key personnel at the SEMAA Sites include the Site Director and the AEL Coordinator.
Partners/Stakeholders	Provide financial and/or in-kind contributions to enhance and sustain SEMAA beyond NASA funding.