NASA MAA (MUREP AEROSPACE ACADEMY) STEM PROJECT AT YORK COLLEGE: ENSURING FUTURE STEM PIPELINE

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Abstract

Our ongoing K-12 NASA-supported STEM activities have served over 6,000 children since 2015, largely from groups that are underrepresented in the sciences. These STEM activities have been successfully delivered for several years and include earth science, meteorology, geology, rocketry, astronomy, and various LEGO Mindstorms robotics, basic coding exercises, wind tunnels. In part, these activities have been led by former participants of our program (many of whom are completing STEM majors in college). It is our center's mission to use these STEM activities as a recruitment tool to various STEM careers for underrepresented groups and minorities, women, and financially disadvantaged groups. The main goals of our program are as follows: (1) to ensure that students gain an appreciation and understanding of the importance of STEM disciplines; (2) to provide a strategic recruitment tool for various STEM careers; (3) to provide a flight simulation experience in the AEL; (4) to demonstrate the finished task connected with fine motor skill, coding, and coordination.

Targeted Goals

- Increase the number of historically underserved and underrepresented students interested in NASA-specific STEM careers.
- Provide skills and background knowledge to parents/caregivers to work with and encourage their children in STEM activities and programs.
- Involve community groups, businesses, libraries, museums, and educational and professional organizations, such as the Geological Society of America (GSA), through mentoring, field trips, guest speakers, and other STEM-related events.
- Engage students in participatory activities, such as hands-on learning, research, using advanced technology, peer support groups, science fair, and mentoring relationships with professionals working in STEM fields.

The inclusivity of STEM activities inherently relates to all facets of STEM, and when students learn through exploration, it increases motivation and desire to succeed. VEX Robotics embraces this model of explorative STEM learning. The magic a student experiences the moment they create something with technology is certainly rewarding and brings joy to them. MAA wants kids to learn how much fun it is to solve challenging problems. VEX Robotics are providing tools which are easy for beginners to master, but will expand with the imagination and experience of their users.

Fig. 1. Well-attended NASA MAA Family Cafe members are not missing out on NASA STEM Contents! 75-125 parents are engaged in STEM and other critical socio-economic aspects each week. MAA is enabling infusion of community and STEM via exciting, hands-on learning activities.

Fig. 2. Jasmine Jean-Remy, past SIEMA student and currently member of the Black Girls Code, standing in front of the StarLab. As part of the STEAM core, Jean-Remy teaches coding to the kids and she is learning Python and Javascript.

Fig. 3. Narenda Gacharana (pre-service teacher) shaking hand with NASA judge (NASA 2017 Robotic Motion Competition).

Fig. 4. York team (from the right: first, Angeles Vivas, pre-service teacher) and Narenda Gacharana (2nd from the right, pre-service teacher) at the 2019 Robotic Motion Competition.

Fig. 5. Wow! That's great. Students from Peninsula Preparatory Academy got the answers related to constellation and soon will be entering the StarLab. (Community engagement, use of advanced technology, peer support group)

Fig. 6. Martian Habitat from 2nd grade's point of view. Quite neat!!

Fig. 7. 4th graders are learning about geological materials by using beach sand. They were utterly amazed to see numerous minerals within the tiny grains of sand. The magic a student experiences the moment they create something with technology is certainly rewarding and brings joy to them.

Fig. 8. Robotics by using EV3 Mindstorms tools. Students (COENTERPRISE-TIM supported, Data Analyst).

Fig. 9. It's not so bad! 4th graders are quite happy to build a solar car from intricate and challenging robotic components.

Fig. 10. Let's see how we can fix the problem. 8th graders taking up the challenge (Jennifer Shang-Guo, Korean American; StarLab On the Move).

Fig. 11. It is always great deal of excitement to use flight simulators and fly a plane. 8th graders are getting a new lesson inside the AEL.

Fig. 12. Matthew Khargie (left), physics major and pre-service Robotics teacher) and Noreen Wills (right, AEL Coordinator) presented STEM research monitored by Khandaker at the annual meeting of the GSA. It is the first time ever NASA students made their debut at the prestigious national meeting from York College and other participating programs--one of the core missions of NASA MAA.

Fig. 13. Nicole Cooper of ICES remained on the flight simulation lesson in the AEL. She visited MAA in a guest session about creating partnerships. Janitorial Center for Arts & Learning is a multi-disciplinary space that are located in the diverse community of Southeast Queens. More than 1,000 hours of strong and backgrounds participate in one ride array of building, programming areas, and visual arts programs annually.

Fig. 14. Jamaica Read Now brought over 5th graders to York College and students were informed by Dr. Khandaker about the unique NASA STEM program where they can earn additional STEM hours during the fall 2018 season.

Fig. 15. VR GOES or drawing attention from the participants and students are exposed to 3D viewing and controlling about Right as well.

Fig. 16. Matthew Khargie, past NASA STEM participant, physics graduate and now employed, COENTERPRISE-TIM supported, Data Analyst.

Fig. 17. Far left: Tech-savvy Florosatal-Kevlener, past NASA STEM Program participant, now doing MS at Cornell University.