STEM Robotics Organizational Expectations

for the program to be successful

Pre-requisites

The host organization must...

1) Have an adequate IT/computing environment (student computers and internet access)
2) Maintain these IT resources adequately
3) Have administrative support for a program that focuses on mathematics and computational thinking
4) Be willing to commit requisite inclass time to implement the mutually agreed curriculum over the life of the project

Students must...

1) Be willing to work hard on mathematics and computational thinking
2) Have an openness to learning
3) Not already be "at ceiling" with mathematics, computational thinking, and robotics

Teachers must...

1) Believe that mathematics and computational thinking are important to STEM careers
2) Have basic computer fluency
3) Be willing to work with students to help them to solve problems
4) Be willing to attend Professional Development sessions
5) Be willing to participate in paid workshops with CMU and Pitt to develop a plan to integrate a STEM Robotics Program into their school's curriculum

Researcher will...

1) Provide PD sessions
2) Provide software
3) Provide hardware for initial implementation
4) Check IT infrastructure

During the Program

Expect the Curriculum to focus on...

1) STEM tasks with connections to mathematics and computational thinking (CT) that lead to student math and CT understanding
2) STEM tasks with high levels of cognitive demand
3) Tasks that build toward a generalized understanding of mathematics and CT

The host organization should expect...

1) To continue providing active support involving both administrators and educators
2) To adapt to meet students' needs to ensure the maximum benefit from the curriculum
3) To have researchers observe teachers teaching and students learning

In Professional Development, educators should expect to learn...

1) Strategies to generate cross-contextual examples that lead to learning transfer
2) How the curriculum supports the development of student understanding of mathematics and CT
3) How to recognize common student misunderstandings and how to correct them
4) How to present the curriculum in a way that scaffolds each lesson's instructional goals
5) How to implement a STEM Robotics Classroom

Intermediate Outcomes

Students in the program should begin to...

1) See math and programming as important to achieve the goals and activities in the curriculum
2) Develop improved communication skills, especially in technical writing
3) Feel an increased sense of competence in mathematics, programming, and/or STEM careers
4) Develop a belief that math is not a "subject" but a tool for other ends
5) Develop a believe that they can program

Teachers in the program should...

1) Present lessons the same way that they are modeled in the PD sessions
2) Use questioning strategies the same way that they were modeled in the PD
3) Feel comfortable with the curriculum and confident that when it is implemented properly that students are learning

The host organization should expect ...

1) To see the benefit of the program
2) Professional effort from CMU and PITT that lead to improved student learning
3) Timely reports from CMU and PITT that document all stakeholders progress on the project