Columbia STEM Alliance

November 2019 Progress Report

95/2018 – PROMOTING/PROVIDING VARIOUS SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS (STEM) PROGRAMS/SERVICES

_____

Contents

_____

1. Summary

The Columbia STEM Alliance (CSA) is a Non-Profit network of educators, business partners and volunteers that inspires interest in and provides direct support for Science, Technology, Engineering and Math education.

In May 2019 the City of Columbia awarded the CSA a $35,000 agreement to provide a set of Science Technology Engineering and Math Programs that help improve STEM outcomes for students in grades K-12, with an emphasis on supporting girls and minorities interested in pursuing STEM.

Over the past four months the CSA has provided STEM opportunities to more than 20 events plus three 1-week student summer camps and two 1-week teacher academies. These programs involved over 1,000 students and more than 25 teachers and instructors as well as parents and guardians.

2. PROGRAMS

Program 1 - Middle School Computer Science:

During the 2019 Summer Steam Camps students learned to use microprocessors to control their robots and older students built personal computers. WeDo 2.0 robotics rollout was launched in Spring 2019 in 21 schools. A WeDo 2.0 robotics competition is being coordinated by CPS and the CSA and will be held during the 2019/20 school year. Micro:bit computers and teacher professional development were provided by the CSA and formed the foundation for the CPS 6th grade computer science program.

Previously, robotics kits were provided to Columbia Public School elementary and middle schools by the CSA for participation in a First Lego League Robotics Qualifier held at Jefferson Middle School (2017 & 2018). This event is held each November/December. To maximize the use of the kits, a Sumobot Robotics event was created and planned for the Spring of each school year. In January 2019, teacher and parent coaches formed after school robotics teams and in April more than 40 students making a total of 10 teams participated in the first Columbia Sumobot Competition. Each team designed, built and programmed their robots using a standardized set of parts. This competition was held at Columbia Independent School and is planned for April 2020.

Columbia STEM Alliance

November 2019 Progress Report

95/2018 – PROMOTING/PROVIDING VARIOUS SCIENCE, TECHNOLOGY, ENGINEERING, MATHEMATICS (STEM)
PROGRAMS/SERVICES
_____

Program 2 - Title 1 Elementary School STEM Field Trips:

Title One Field Trips: These field trips will occur during the 2019/20 school year. Field trip destinations have been identified and vetted to ensure that each trip is a valuable experience and relevant to classroom curriculum. Destinations include City of Columbia Utilities and Public Works locations.

Program 3 - STEM Summer Opportunities:

STEAM BUS: Since May over 1,000 students plus parents, guardians, and teachers have participated in STEAM Bus events – including Cosmo Family fun nights, Saturday Farmers Market , and Columbia Parks and Rec neighborhood events at White gate neighborhood, Bear Creek Park, Derby ridge and Indian hills, and Business loop pocket parks. September events currently include Coding with your kids, MU Steam Cubs and school visits. In addition, over 50% of the students who participated in Summer STEAM camps received fully funded scholarships.

Program 4 - Summer STEAM Camp 2019

Two 1-week camps	Main Project – all students
97 Campers	• Deconstruct electronics and reuse to build projects
20 scholarships	• Design and build moveable art
13 Teachers, Shelter Insurance Volunteers & CSA Board Volunteers	• Connect motors and light to movable art creations
Academic classes in the morning.	• Program microprocessors to control creations
Applied engineering and project work in the afternoons	• Additional Project – all students: Build 4 servo drone
Display of robotics examples to be shown at REDI and City Hall	• Additional Middle school project – Build PC
Roots and Blues Display	

Program 5 - Girls STEM Summer Camp:

One 1-week camp	Main Project – all students
25 Campers (all girls)	12 teachers (all female) - 6 classes
Focus was to provide female role models for campers in various STEM fields.	Areas of focus - Health Sciences, Architecture & Design, Business & Marketing, Textiles, Engineering

3. Demographics

Columbia STEM Alliance - Demographics - Dec 2018 to Aug 2019												
	Gender % Served		Ethnicity % Served									
	Male	Female	American Indian/Alaska Native	Asian	Black/African American	Hispanic/Latino	Native Hawaiian/Other Pacific Islander	Two or more races	White	Other/Unknown	Economically Disadvantaged Percent Served	Total # of Students served
Program 1 - Middle School Computer Science	782	812	16	80	320	96	16	111	955	0	1195	1594
Program 2 - Title 1 Elementary School STEM Field Trips	368	384	8	38	150	45	8	53	450	0	564	752
Program 3 - STEM Summer Opportunities	294	306	6	30	360	36	6	42	120	0	450	600
Program 4 - Summer STEAM Camp 2019	56	43	0	15	10	15	0	5	54	0	55	99
Program 5 - Girls STEM Summer Camp:	0	26	0	2	3	1	0	0	10	10	2	26
Total Number of Students Served	1500	1571	30	165	843	193	30	211	1589	10	2266	3071

4. **Program Costs**

The total cost for these programs over the past 10 months is $92,876. Table 1 describes how City funds have been distributed.

Table 1: Program Costs	City Funds	Total Program Cost	Program Status
Program 1 - Middle School Computer Science	$5,000	$7,888	Program contuining
Program 2 - Title 1 Elementary School STEM Field	$5,000	$5,000	2019/20 School yr
Program 3 - STEM Summer Opportunities	$5,000	$11,339	2019 Program complete
Program 4 - Summer STEAM Camp 2019	$10,000	$47,825	2019 Program complete
Program 5 - Girls STEM Summer Camp:	$10,000	$20,824	2019 Program complete
Total	$35,000	$92,876	

City funds have made the programs viable and every dollar the city has invested in these programs has been matched at a rate of 2.7:1 by individuals, local businesses and organizations including: The 3M foundation, The VU Foundation, Central Bank, Shelter insurance, Schneider Electric, Boys and Girls Club, Columbia Cosmopolitan Luncheon Club.

5. **Partnerships**

In addition to financial support local businesses provided direct personal and material support for these CSA programs. Shelter IT staff work with students during the summer camp to help them program and trouble shoot their robots. Shelter management participated in the STEMette and summer camp programs. Central Bank hosted an employee STEAM Bus recognition in downtown Columbia. 3M employees have participated in STEAM bus activities where they worked directly with students and 3M management participated in the STEMette and summer camp programs.

The CSA partnered with the City Parks and Recreation, Public Works, Water and Light, Solid-Waste and Wastewater Treatment Plant staff to provide summer. Engineers form the City utilities provided lessons during the STEMette Girls summer camp. The City Public Outreach & Educational Programming coordinator participated in the Summer Steam Academy. The City Public works staff organized, coordinated and provided space for Snow Palooza. The parks and recreation department organized, coordinated and provided space for Family Fun Fests.

MU's Department of Architectural Studies and School of Engineering hosted the STEMette program. Students worked in labs and workshops, with university professors and community instructors to conduct scientific experiments as well as design and build projects. Students attended classes in university classrooms and were served meals at university cafeterias.

_____

Columbia College and Jefferson Middle school hosted the Summer STEAM camps. Students attended morning classes at Columbia College and participated in robotic design, program and build activities at Jefferson middle school in the afternoon. The Boys and Girls club of Columbia was instrumental in engaging minority students and students from underserved populations to help ensure a diverse group of students were included in each of these programs.

The Columbia Public Schools, Moberly Area Community College, University of Missouri, Veterans United and Engineering Surveys and Services, William Woods University provide ongoing support via representation on the CSA board of directors, organizing events and creating programs.