Wolfe County STEM Program

A Program Overview of Wolfe County Schools' STEM Program

OBJECTIVES

1. Increase students' and community awareness of the possibilities of awareness in STEM careers and industries
2. Increase student achievement and interest in Science, Technology, Engineering and Mathematics.
3. Increase cooperation in STEM teaching and learning within and between the different schools in our district.

SCOPE

1. Summer STEM camp targets students in grades 6-10, but is open to any interested students. This year we had Seniors mentoring 4th grade students within the same sessions.
2. District-wide STEM day with 40+ high school students planning and delivering STEM lessons to all 3 elementary schools in the district, with all students grades K-6.
3. Aerospace Career Pathways (grades 9-12) leading to college dual credit and work-ready certificates.

COSTS AND FUNDING

PROGRAM EXPENSE	COST	FUNDING SOURCE
Supplies and Staffing for STEM Camp	~$8000 per year	Mercy International Llc.
Meals for Students at STEM Camp	$1,000 per year	Summer Feeding Program

Aerospace Engineering Career Pathway	Up to $4000 per year	District Perkins Funds, KVEC, Mercy International
District-Wide STEM day Supplies	$400~$800	FRC/YSC, STEM program funds from KVEC, Teachers
District-wide STEM Day transportation, substitute teachers, etc.	$800	general fund

SCHOOL BOARD INVOLVEMENT

Summer STEM Camp: Board members have personally visited and expressed interest in STEM Camp presenting the camp's mentor and supporting charity with a plaque expressing appreciation. We have had access to classrooms in both the middle and high schools

Aerospace Pathway: The school board designates a yearly budget for the Aerospace Engineering career pathways. We have used our budget to purchase flight simulators, buy drone parts and build kits, radio equipment, and build a wind tunnel.

INNOVATION IN EDUCATION

Summer STEM Camp

- High school upperclassmen act as leaders and mentors for younger students.
- High school and middle school teachers collaborating to plan and coordinate the camp.
- Student have access to learning with UAS (drones), 3-D printing, electrical systems, engineering design processes.
- Students have built and launched rockets, built and raced hovercraft, built and competed in Rube Goldberg design challenges, built and used telescopes, built and raced solar robots and science cars.

District-wide STEM Day

- High school teachers led high school students in planning STEM lessons for students in grades Kindergarten - 6th.

- High school students delivered 20-minute STEM lessons to elementary students from the entire district in groups of 12-15 students.
- Middle school students acted as guides and mentors with groups of elementary students.
- One group of middle school students conducted robotics lessons for elementary students.

ASSESSMENT OF PROGRESS

Summer STEM Camp: We began the program with approximately 25 students in the first year of the camp and added to them slowly with just over 30 the next two years. This summer we had over 45 students attending, including several from outside our county or district and students representing all the schools in the district. We have added several new technologies to support our STEM program within the district through cooperation with Mercy International and other community partners.

District-wide STEM Day: This idea was over two years in planning to make a reality. Elementary teachers requested high school support in implementing STEM lessons and the help came from not high school teachers, but from our students. Upperclassmen did not just deliver STEM lessons, but they planned them to be aligned to the age-appropriate science and math curriculum, including the Science and Engineering Practices in Kentucky's Science Standards.

Aerospace Engineering Pathway: Students who began this pathway two years ago are working toward an Remote Pilot-In-Command certificate as they are planning their own business ideas using Unmanned Aerial Systems (drones and sensors). These students are planning to take a dual-credit aviation course through EKU this spring. Second year students are also learning about drones, robotics, aviation, space systems and radio communications. There are 22 students in the first year of the program as we are field-testing a new curriculum from AOPA.

Wolfe County STEM Program Teachers

Attn: Matt McCarty
Re: PEAK Award
Kentucky School Boards Association
260 Democrat Drive
Frankfort, KY 40601

September 25, 2017

To the Kentucky School Board Association,

We the teachers involved in the Wolfe County STEM program endorse the nomination of our program to the Kentucky School Board Association's PEAK Award. Since beginning this program 4 years ago, we see our students gaining interest and understanding in Science, Technology, Engineering, and Mathematics. They gain a greater appreciation for the possibilities that exist in the future careers and industries that are among the fastest growing in the world. Our students have enriched learning opportunities and our older students develop leadership and communication skills they will carry into whatever careers they choose.

This program has an enduring impact on the way we teach our students. We provide them with opportunities to take control of their own learning and even teach what they know to others. Rather than relying on us for all their answers, they gain independence in their education and become more than just self-motivated; their enthusiasm spreads to others. We see them work collaboratively and think creatively to solve complex problems. They move beyond just following instructions and recalling information, developing 21st Century learning and leadership skills.

Sincerely,

Zachary Collier

Chad Rudd

Steve Salyers

Derek Burton

Beth Thompson

George Collier

24 September 2017

Matt McCarty
PEAK Award
Kentucky School Boards Association
260 Democrat Drive
Frankfort, KY 40601

Dear Matt McCarty,

As students of Wolfe County High School, we endorse the nomination of the school's program to the Kentucky Board Association's PEAK Award.

As a freshman in high school, whenever I heard the acronym 'STEM' I would hang my head because I knew what was coming... math. I had great grades, I learned some things, and I passed the grade. During my freshman year, I started to love 'STEM'. I assume there will be other students who are passionate about the STEM field, but my passion for it is not just because it is hands-on, has drones and 3D printing involved, challenges my mind. My passion formed because 'STEM' changed my point of view. When I needed a break to distract my mind, the 'STEM' fields is what I turned to. Anytime I was stressed, bored, or struggling with myself as a person, STEM helped me through. I have learned that humankind is constantly growing as a species, that robots are not just science-fiction anymore, but a reality. I can now answer the question, "Why do planes fly?" Yes of course, math was involved, but I gladly did the math as long as I found out the perfect angle to start descending in an airplane, how to take a smaller object in a picture and find out the area of the space in real life, how to properly print rocket noses and fins to fit the body of a rocket. We did not just come up with a plan to fix problems, but we also carried out to the solution.

-Elizabeth Gilbert Elizabeth Gilbert

As a STEM student in the aerospace class, I have a newfound interest in some aerospace aspects. I am currently a junior taking the third year class, and all of it has influenced some possibilities for the future. We have been working with drones now for over two years, starting with a DJI Phantom 3 and two 250 racing drones. This experience has given me a new interest in UAV/drone flight, and being that I am unsure of my future career choices, it sounds like a possibility. We have also been learning about pilot certifications and restrictions along the way. It has made me consider the possibility of earning a private pilot's license because it is something that could lead to an instructional career in pilot training. Plus, I could fly if I wanted

to. The influences that made me consider aerospace careers are great, but the reward can be much greater. This is something all STEM-loving students should think about.

-Brendan Bush Brendan Bush

Since about the fifth, maybe sixth grade, I have been deeply involved with the STEM program. I have participated in the STEM camp that takes place at the local high (and middle) schools every summer since about the second year it was held there. My career interest in astronomy has led me to be more deeply involved still; being in my first year in high school, I have seized the opportunity to take the aerospace class offered there. Since the STEM program was introduced to this area, the school district – particularly my father, Zachary Collier – has endorsed the education of students in the principles of the field. While I have not yet received an invitation to assist in it, there has been a STEM day dedicated to introducing elementary school students to the science, technology, engineering, and mathematics that are typically only explained to students at the secondary level. Overall, there has been a multitude of motions to provide education in the area of STEM within our school district, which I hope qualifies us for the PEAK award.

While I may be overstepping my boundaries by including this information, one of the biggest contributors to the STEM cause is my aforementioned father Zach. While he hasn't been a major supporter financially, where those like Dr. Gary Boothe have, he has taken the majority of the organization of the events (and this letter), along with the most harrowing tasks related to the program upon himself. I firmly believe that no one else has worked harder to deserve an award, even if it is not only for him.

- Austin Collier Austin Collier

Before I got into highschool I had no interest in anything stem related but my DS. At some point my mom asked me, "Wanna be in the aerospace program?" and I was like "Yeah, sure." Since then I have discovered that I would love to be a space systems engineer. Being a group leader at STEM camp has helped me grow my leadership abilities. Although the program is very young, I think that its expansion could open up many more people to many more advanced career choices.

-Dillon Mayse Dillon Mayse