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Opportunity and Access to Informal STEM Learning Environments

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Opportunity and Access to Informal STEM Learning Environments

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University of Kentucky

College of Education

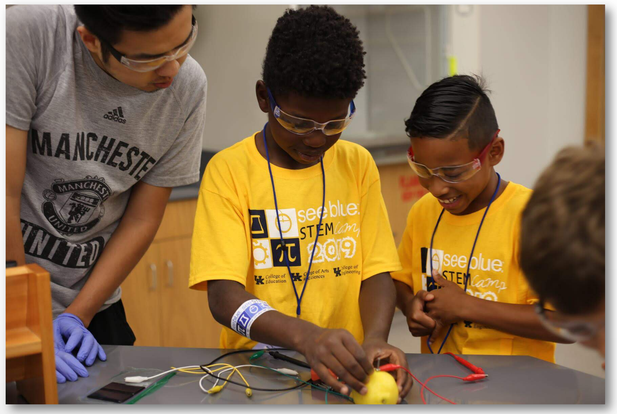
University of Kentucky STEM EXPERIENCES

Purpose and Goals

The UK STEM Experiences is a collaboration amongst the UK Colleges of Education, Engineering, and Arts & Sciences. Our goal is to expose students to a variety positive learning experiences and career options in the STEM fields. Additionally, the summer experiences…

- Target rising elementary and middle grades students (grades 5-8) especially females, students of color, and students disinterested in STEM
- Provides authentic, hands-on, engaging STEM learning environments on the University of Kentucky campus
- Provides opportunities for preservice teachers and graduate students from STEM disciplines to assist with camp and gain valuable content knowledge and experience in an informal, low-stakes environment
- Partner with area school Youth Service Coordinators to recruit and retain underrepresented populations
- Area preservice and inservice teachers assist with the camp gaining valuable STEM laboratory experience and ideas that they can incorporate into their own classrooms

The week-long day camps are designed to help students explore and integrate the STEM disciplines through authentic hands-on projects and real-world applications.



Students in the elementary camp discover they can use a lemon to create a simple battery to power a LED light bulb.

In the Students' Words…

"I want to become a doctor when I grow up, and to do so I need to know a lot about anatomy. Dissecting animals really helps me learn more…"

"It is hard for me to learn as fast as other people because I am more of a hands-on person. So, when there is a hands-on activity, I am really happy because I get (to) learn. I get to see. I get to feel. I get to touch, and I like how STEM camp incorporates that in a fun and awesome way…"

"I would say STEM camp, it kind of just, it kinda gives you a little bit of everything."

"Like I see those robots at the hospital carrying, uhm, things that humans would be carrying...that would make the world a better place."

"If I have a chance, I could probably make some kind of combination of a car that can use hydropower, but at the same time use solar energy to use a new source of fuel, instead of gasoline."

Creating Opportunity and Access for Each and Every Student

- Goal is 50/50 sex ratio and at least 25% students of color
- Over the past 5 years, total of 55% or more underrepresented students have participated
- Partner with area Youth Service Center Coordinators, area school districts, and community centers to help recruit and retain underrepresented populations
- Vary topics and presenters from year-to-year to help peak interest and exposure
- Recruit presenters of color and females in STEM fields to work with and mentor students
- Involve our area inservice and preservice teachers, and graduate and undergraduate students

Middle school students test the voltage of their solar panel they created using pomegranates.

Elementary students conduct a reflex investigation on crayfish.

Impact

- The benefits of participating in the STEM summer learning experience also extended to student's perceptions of classroom STEM learning.
- Students acknowledged the access they received to hands-on activities in authentic STEM settings and the opportunities they received to interact with STEM professionals were important components of the summer informal learning experience.
- When provided the opportunity to access STEM, students were engrossed in the learning and eager to experience the activities.
- The pedagogical approach of the STEM summer learning experience balanced guided learning and student exploration through activities that the students attest are an essential element to their rich learning experience.
- Schools are often limited in the access they can provide to in-depth content and authentic settings. Unfortunately, this disproportionately affects Black and Latinx students, which is something STEM camp specifically attempts to counteract.
- When students see how solving authentic problems through STEM can make their lives and the world a better place, they are more interested in pursuing STEM careers.
- The activities during the summer learning experience either expanded or broadened students' interests in STEM careers.
- Many students were influenced by their desire to help others and make the world a better place, and some even recognized how their STEM learning experiences could be applied to improve the world.
- The students interacted with STEM professionals in authentic ways, which also heightened and piqued their interest in STEM and STEM-related careers, and some even described specific desires to pursue STEM careers.

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