News Release

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Cecil County's STEM Summer Camp Investigates 'Crime Scene' at ECBC

Aberdeen Proving Ground, Md. – Workforce members from the U.S. Army Edgewood Chemical Biological Center (ECBC) supported Cecil County's science, technology, engineering and mathematics (STEM) summer camp with a hands-on forensics experience 'CSI:Edgewood' on June 21.

Sixteen sophomores from Cecil County's STEM Academy and their chaperones were presented with the challenge to conduct a fictional forensics investigation based on the lessons they acquired at each ECBC station. Their fictional task consisted of initiating investigative steps to keep their community and nation safe, after told that an unknown compound was discovered in Edgewood.

In an effort to reinforce students' interest in pursuing STEM career pathways, ECBC subject matter experts that were funded by the National Defense Education Program revealed the importance of their technology area in the process of collecting crucial evidence to solve a criminal case.

Focused to protect U.S. Forces and the Nation against chemical, biological, radiological, nuclear and explosives threats, ECBC's workforce members are experts at developing science and engineering solutions that can also be applied to legal problems.

First off, the group of students stopped at the Center's Advanced Design and Manufacturing facility where engineers introduced ECBC's robotics detection and the 3D laser scanning capabilities.

They explored how the Robot Recon (R2), a technology combination of robotics and electronic detectors, can lower the risk to soldiers and first responders when rendering a designated area safe. In addition, ECBC Electrical Engineer Mark Colgan offered them the opportunity to manipulate the R2 and experience its real-world application.

"Allowing remote sensing of hazardous conditions, this advanced technology greatly enhances the individual reconnaissance capabilities of any organization," said Colgan who helped develop the R2. "During a forensics investigation, it can provide accurate information about the nature and type of hazard to ensure first responders wear appropriate equipment when entering potentially contaminated space."

Then, Engineering Technicians Ryan Gilley and Samuel Silva demonstrated the application of reverse engineering and 3D laser scanning to create digital models of anything from skeletal remains to tire tracks in Computer-Aided Design.

“The data we can collect with 3D laser scanning allows us to rebuild crime scenes and retrace death causes,” Gilley said. “The Center’s rapid prototyping capability enables the creation of physical models based on digital models.”

Under the direction of Research Microbiologist Lauren McNew, students collectively engaged in the scientific process of extracting DNA from strawberries, while adhering to techniques typically performed in a laboratory setting.
“Due to strawberries exhibiting many more DNA copies than humans, their genetic information becomes visible without any special instrumentation,” McNew said. “In criminal cases, samples of crime scene evidence are usually analyzed for the presence of a set of specific DNA markers.”

With Electrical Engineer Phillip Wilcox, they discovered the use of Raman spectroscopy, a non-destructive technique to identify a wide range of solid and liquid substances. The group practiced how to detect compounds, such as baking soda, caffeine, and acetaminophen with a Raman spectrometer and documented their results accordingly.

"This powerful, analytical tool enables the identification of molecules and has gained popularity with first responders, law enforcement personnel, safety agencies and the military," Wilcox explained. "It scatters laser light to new wavelengths forming a unique spectral fingerprint that can be used to differentiate and identify chemical and biological materials."

At the last station, Cecil County sophomores were immersed in the Center's capability to perform chemical biological operations in a safe, secure and environmentally sound manner. After Chemist Jennifer Exelby spoke about critical steps within the sample receipt and triage process, some students simulated the process of handling and screening unknown samples in a glovebox.

"As soon as we receive an unknown sample, we conduct a risk assessment to determine where and how the compound should be handled," Exelby said."Furthermore, we document the movement of samples through use of a chain of custody for each sample so that we can maintain oversight at all times."

This real-world forensics experience exposed students to a wide variety of STEM careers and expanded their knowledge of technologies developed at ECBC that can be used in support of a crime scene investigation.

“Words can’t really describe all the amazing things we’ve seen [at ECBC],” said tenth-grade Rising Sun student Josh Wheeler. “This experience was very thought-inducing, and we were able to experience technologies that I have not seen anywhere else thus far.”

For more information about ECBC, visit http://www.ecbc.army.mil/.

ECBC is the Army’s principal research and development center for chemical and biological defense technology, engineering and field operations. ECBC has achieved major technological advances for the warfighter and for our national defense, with a long and distinguished history of providing the Armed Forces with quality systems and outstanding customer service. ECBC is a U.S. Army Research, Development and Engineering Command laboratory located at the Edgewood Area of Aberdeen Proving Ground, Maryland. For more information about the Edgewood Chemical Biological Center, please visit our web site at http://www.ecbc.army.mil/ or call (410) 436-7718.

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