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CT Schoolchildren Test Genetically Modified Food *CURE BioBus Experiment Offers High-Tech Lab Experience*

CURE's BioBus Educational Programs has added a new Genetically Modified Organisms experiment to its repertoire. Offered for the first time this year both on board the BioBus and in BioConnection equipment loan modules, Genetically Modified Organisms is designed to investigate the process of creating and detecting genetically modified foods. The new experiment is part of the BioBus Programs' newly revised curricula aligned with Connecticut state science requirements.

"The experiment is valuable because it provides a terrific platform for teaching basic genetics concepts such as DNA structure, function and replication, as well as introducing students to the technology and real-world applications of molecular biology," says Kerry Donahue, senior staff scientist for the BioBus Educational Programs. "Like the other experiments offered, this is a complete science experience, combining pre-and post-labs that better integrate the experiment into a teacher's existing curriculum."

The Genetically Modified Organisms experiment incorporates a post-lab where students must investigate the pros and cons of genetic modification of foods, a task that appears in state materials used to prepare students for the science portion of the Connecticut Academic Performance Test (CAPT), given to every tenth grade student across the state. Rounding out the experience is a training program that allows teachers to familiarize themselves with the equipment and techniques required, and to effectively incorporate this technology into their classrooms.

In the experiment, a company that sells organic, non-genetically modified soy flour suspects that some of their fields have been contaminated with genetically modified soybeans. Students must use a standard biotechnology technique, known as polymerase chain reaction, or PCR, to determine which batches of soy flour are indeed GMO-free, and which batches have been genetically modified.

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Saint Joseph High School seniors Crystal Carvalho and Rachel Sheehan place PCR tubes into a thermal cycler donated by Bio-Rad. Lisa Cellini, a science teacher at St. Joseph High School in Trumbull, incorporated the BioBus Programs' new Genetically Modified Organisms experiment into her senior microbiology class.

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Students first isolate DNA from various samples of soy flour, then use polymerase chain reaction to amplify, or make millions of copies of, a particular section of the DNA that has been genetically inserted into the plant. Once amplified by PCR, the DNA can then be separated and visualized by gel electrophoresis, a process that uses electricity to carry molecules, such as DNA, across a gel.

PCR is a widely used, standard biotechnology technique; however, few high schools can afford the equipment and materials required. The biggest-ticket item, known as a thermal cycler, is a machine used to perform the actual DNA amplification. Thanks to generous donations from Edvotek, Bio-Rad, and Invitrogen, the BioConnection program now has two thermal cyclers, as well as all the electrophoresis equipment and materials needed for students to perform PCR.

"We very much appreciate the commitments made by these companies", says Sarah Berke PhD, director of the BioBus Educational Programs. "Their generosity allows our program to offer this state-of-the-art equipment free of charge to students across Connecticut."

In its first year, over two dozen teachers have been trained in PCR and in the Genetically Modified Organisms experiment. Reaction to the new experiment and equipment has been extremely positive, Berke says.

Joshua Beebe, a 10th-grade science teacher at the Sport and Medical Sciences Academy in Hartford, recently borrowed one of the BioConnection PCR modules. "The experiment rocked," Joshua

said. "The kids really got into it. And the feedback I got was that the experiment really helped them on the CAPT exam."

"The GMO experiment was a great experience for my senior genetics students," said Lisa Cellini of St. Joseph High School in Trumbull. "The hands-on activity led to better understanding, and there were opportunities to team teach with social studies, economics, and business teachers. This was a total learning experience that covered content and encouraged further exploration."

The BioBus staff expects that the popularity of the experiment will continue to grow; the next teacher training workshop will be held this June, with hopes of training at least two dozen more teachers for the next school year.

Outfitted with the latest in bioscience equipment and state-of-the-art computers, Connecticut's BioBus is a 40-foot-long mobile science learning center designed to foster the excitement of scientific discovery.

Under the BioConnection Program, which is free of charge, schools are lent laboratory equipment, and teachers are trained to conduct in their own classrooms experiments from the curricula of Connecticut's BioBus.

The BioBus and BioConnection Programs were inaugurated by CURE, the state bioscience organization, and rely primarily on CURE members and other Connecticut businesses and organizations for funding.

Since its inception, the Programs have trained more than 600 teachers through professional development workshops and reached more than 52,000 students at over 300 schools. Connecticut's bioscience industry currently employs more than 17,000 persons and is expected to grow.

For more information about the BioBus Educational Programs or to sign up for a workshop, visit the website at www.ctbiobus.org or contact Sarah Berke at 203-777-8747.

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