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UA centers partner with Hellstern to test new science lessons in Springdale

By [Brenda Bemel](#)
Posted: October 13, 2016 at 1:06 a.m.



MICHAEL WOODS • @NWAMICHAELW
Credit: NWA Democrat-Gazette

Tyler Van Vacter, (left) and Bryan Cenobite, sixth-graders, talk Wednesday with their teacher Cassie Kautzer as they experiment with thermoelectric generators during their science class at Hellstern Middle School in Springdale.

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SPRINGDALE -- Sixth-graders in Cassie Kautzer's science class watched a small fan spin with power created by water.



India Harris, (from left) Greer McAllister, Naydelin Segura, and Marissa Scott, sixth-graders, read their data Wednesday as t...
(By: MICHAEL WOODS • @NWAMICHAELW) (Credit: NWA Democrat-Gazette)

"It's really fun the way that our teacher sets up experiments for us," said Bryan Cenobio, 12. "I'm having fun. That's why I like doing science."

Three sixth-grade teachers at Hellstern Middle School this week are piloting a series of lessons on energy flow and conversion developed through a University of Arkansas research program interested in thermal and electrical energy in vehicles.

Kautzer introduced the unit on energy conversion Monday with a video exploring the concept of heat being a wasted byproduct of machines, she said. Students spent Tuesday and Wednesday working on labs using thermoelectric generators. The unit will continue with students evaluating their results, explaining what they mean and discussing how wasted energy from heat could be used.

The unit explores some of the same concepts that are of interest to University of Arkansas researchers in physics, engineering and computer science who are part of a Power Optimization of Electro-Thermo Systems program, said Shannon Davis, the program's education activities coordinator. The program is funded by a National Science Foundation grant and involves the University of Illinois at Urbana-Champaign, Howard University and Stanford University.

The power optimization program is focused on making cars and vehicles more powerful without using more fuel or creating more



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Fast Facts

University of Arkansas Center for Mathematics and Science Education: Provides training, materials and information to home school, private school and public school educators. More information can be found online at cmase.uark.edu

Power Optimization of Electro-Thermo Systems program: Engineering research center

involving the University of Arkansas, the University of Illinois, Howard University and Stanford University interested in improving current thermal and electrical limits in vehicle designs to make cars, trains and airplanes more powerful without using more fuel or creating more heat.

Source: University of Arkansas

heat, Davis said. Another aspect of the program is inspiring students to take an interest in power so they grow up to make cars and airplanes work better, Davis said.

In the two-day science lab that ended Wednesday, students made fans spin with the help of thermoelectric generators — two side-by-side metal canisters, one for hot water and one for cold water, that were attached and had a chip between them and red and black wires. Students connected the wires to fans, small light bulbs, buzzers and voltage meters.

Bryan's group observed that stirring the water quickly made the fans spin faster, he said.

One of Bryan's four group partners, Warrick King, 11, said energy is created from the interaction of cold and hot water, but that doesn't happen when both canisters have cold water.

Science teachers across the state are transitioning to new standards that emphasize less memorization of facts and more thinking and problem solving, said Shawn Bell, former Farmington teacher.

Bell took short courses with researchers in the power optimization program and wrote a series of lessons over the summer, he said. He consulted with Kathy Prophet, a Hellstern science teacher who was on the Next Generation Science Standards writing team. In August, Bell became a science specialist in the university's Center for Mathematics and Science Education. He maintained his connection with Davis and Prophet.

The State Board of Education in 2014 endorsed the national Next Generation Science Standards and authorized the Arkansas Department of Education to develop them into standards that fit the state's curriculum mandates, according to the department. The new standards were implemented this school year for kindergarten through fourth grade, with fifth through eighth grade following in 2017-18 and ninth through 12th grade in 2018-19.

"In today's world, students don't need to memorize facts," Prophet said. "They need to be able to think, analyze situations and take care of the problems of today."

Davis sought a group of teachers to pilot the lessons Bell developed and selected Hellstern. Plans are to continue developing science lessons and to share the lessons with teachers implementing new science standards in Arkansas and around the country, Davis said.

The concepts taught in the new unit on energy flow and conversion will carry into other science units, including one on weather, said Kautzer, who was named by the White House in August as a recipient of the Presidential Awards for Excellence in Mathematics and Science Teaching

Kautzer lets her students know she is not an expert in engineering or thermal energy, she said.

"We can work through labs and figure it out together," she said.

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