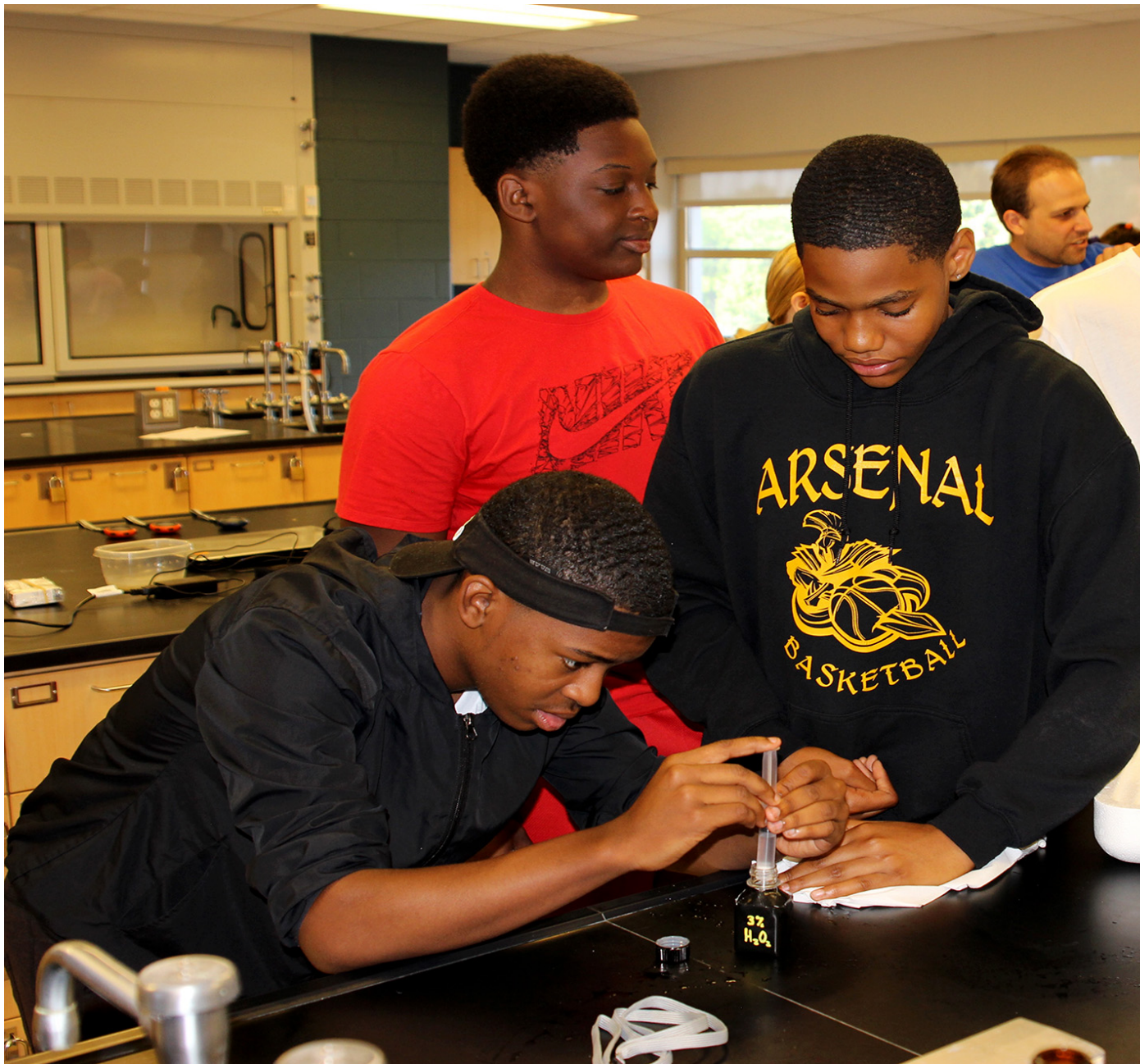

COLLEGE OF ARTS AND SCIENCES

Project Upward Bound
students explore sciences
at OU under auspices of
NSF grant



Students from Oakland University's Project Upward Bound (PUB), a multi-faceted college preparatory enricher July 11 during a series of hands-on experiments in Hannah Hall.

📅 July 18, 2018

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A group of 23 students from Oakland University's [Project Upward Bound](#) (PUB), a multi-faceted college preparatory enrichment program, learned about biology, chemistry and physics on July 11 during a series of hands-on experiments led by [Dr. Thomas Raffel](#), an assistant professor of biological sciences at OU.

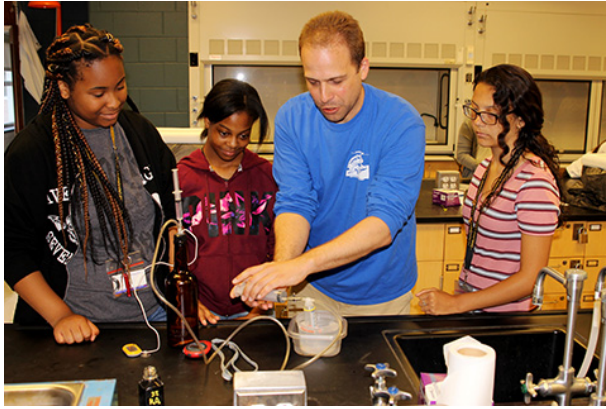
“We’re studying humans and frogs to determine how different organisms respond metabolically to temperature changes, and why those responses are different,” Raffel said.

The experiments were conducted in Hannah Hall on OU’s campus as part of the educational component of a five-year, \$964,898 [grant](#) awarded to Raffel in 2017 by the National Science Foundation for his research on the effects of temperature variation on Chytridiomycosis, an infectious disease that has been linked to mass amphibian die-offs and extinctions throughout the world.



Students from Oakland University’s Project Upward Bound (PUB), a multi-faceted college preparatory enrichment program, learned about biology, chemistry and physics on July 11 during a series of hands-on experiments in OU’s Hannah Hall.

“The whole idea of the grant is to study how organisms respond metabolically to temperature,” Raffel said. “According to the metabolic theory, all



Dr. Raffel working with PUB students.

organisms' physiological responses, ecological rates, etc. should be fundamentally limited by their metabolic rates. If we can develop models to predict temperature dependence of disease that are based on metabolic response to temperature, that could allow us to make much better predictions for a bigger range of species.”

The students were divided into groups and conducted experiments involving biology, chemistry and physics.

“The biology students are going to measure directly those metabolic responses to temperature in humans and frogs,” Raffel said. “The chemistry students are essentially going to be simulating a frog with chemical reactions and answering the question ‘why do frogs respond the way they do?’ The physics students will be using the same chemical reactions to mimic or to simulate a mammal and how mammals respond to temperature changes.”

In one of the experiments, the cold pressor test, students placed their hand in ice water and measured the change in their heart rate.

“This is a classic medical diagnostic procedure that has been used for decades to diagnose risk of developing hypertension in the future,” he said. “What we’re using it as is a way to measure human metabolic responses to cold temperature exposure. In this case, all the student does is measure their resting heart rate, stick their hand in ice water, and measure the change in their heart rate, as well as the change in their body temperature. They use this data to determine how their body temperature and heart



PUB students in the lab.

rate, as well as their underlying metabolic rate, change in response to cold temperatures.”

According to Darralynn Jones, the science teacher with Project Upward Bound’s Summer Academy, the students were excited to participate in the experiments.

“This project has really piqued their scientific interest,” she said. “They’re engaged and they’re excited to learn.”

The Project Upward Bound College Prep Academy is under the umbrella of the TRIO Programs, which were established when Congress passed the Higher Education Act of 1965, now known as the Higher Education Opportunity Act (HEOA). A federally funded program, PUB has been in place at Oakland University since 1966 and serves 133 students per year. Its mission is to provide academic, social, cultural, and career enrichment that prepares students to succeed in higher education.

To learn more about Project Upward Bound, visit www.oakland.edu/upwardbound.