

Perrysburg High School

13385 Roachton Road
Perrysburg, OH 43551
Teacher: Nate Ash

Perrysburg is the sole high school in the Perrysburg Exempted Village District in Wood County. Nate Ash teaches physics to eleventh and twelfth graders. Ash has taught professional development programs at the Northwest Ohio Center of Excellence in Science and Mathematics Education, and at Bowling Green State University in Ohio. He acts as a mentor to new science teachers.

- ◆ High (9–12)
- ◆ 90% White
- ◆ 2% African American
- ◆ 3% Hispanic
- ◆ 3% Asian
- ◆ 5% Free or Reduced-price Lunch
- ◆ 9% Special Education/Disabled

Ash teaches physics using an inquiry approach. Students do lab activities and solve problems together to understand key concepts in physics. In each lesson he poses higher-order questions to help his students build explanations: How do you know that? What would happen if we changed this variable? How is this similar or different? Ash uses whiteboards in a number of ways: for group problem solving, representing a phenomenon with pictures, and student presentations.

Each new unit/topic is introduced with a hands-on activity. Ash presents a physical situation to students, has them manipulate the variables, and then narrows down their list of variables to design an experiment. Every experiment is introduced with an open-ended question (What would happen if...? What happens when...?). Students work in small groups to describe what happens with graphs, pictures, mathematical equations, and written expression. When they are finished, students present their work to the class in “whiteboard sessions.”

Ash explains how the whiteboard sessions give important insights into student thinking: “We can really see if the students understand on every different level how that problem works or how that situation works. And if there is a disjoint between any of those representations, that gives us someplace to go, that gives us something to talk about, something to work through.”

Students appreciate being in charge of their own learning, having the opportunity to challenge their peers, and develop critical thinking skills as they explain their ideas in front of a group. As Ash says, “Students really like this approach because, instead of just giving them the answer, it gives them a chance to explain to each other what’s going on. And I like it because all the times that I have done physics problems on the board and gone through the answers, I got pretty good at doing physics problems but my students never got any better at all.”

Ash has found that with this approach his students are no longer trying to find equations that fit the problems, but working to develop a deep understanding of the underlying concepts.

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