Performance-Based Assessment: Engaging Students in Chemistry

In Hampton High's PBA Chemistry Research Project, students create a model of their compound, produce a video about it, and defend it in a debate.

https://www.edutopia.org/video/performance-based-assessment-engaging-students-chemistry

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Marguerite: These kids aren't just doing research to do research. We're making sure kids are able to apply the information across the curriculum and in different aspects of life. That's real world, that's a skill kids need to leave high school with. Our performance-based assessment does come from that idea of rigor and relevance, and the idea of it is that your assessments require students to think at a high level of rigor, so that they're synthesizing information. They're creating from the information that they've garnered. We're making sure kids are able to apply critical thinking skills, problem solving skills across the curriculum and in real world applications.

Kenneth: Can you apply the stuff that we were talking about in class to this new scenario that you may or may not be familiar with? In this case, a research project is the performance-based assessment. The project itself has multiple components. When I first made the assignment, they see the rubric of how I'm going to grade every component of it. They have to make a model of their compound using proper bond angles and show relevance by what they're using to make their model out of.

Student: One thing that is being looked at is design--

Kenneth: The video component is where they present the pros of their compound. Instead of doing it as a straight research and presentation, I decided to change it into a debate and amp up the project. They picked similar compounds and debate which one is the most effective.

Today our debate is diesel versus octane and we're going to get rolling.

Student: The main use for octane is as an ingredient in car fuel. Even the supreme grade octane gasoline isn't as expensive as diesel fuel is.

Kenneth: Through the rubric, part of that is to discredit their opponent and use their video against them, so they have to have all this research prepared ahead of time and they're taking avid notes.

Student: Diesel fuel contains about fourteen percent more energy by volume than gasoline. This gives it a significant edge in fuel economy.

Student: If you had a forty-two gallon barrel of petroleum, twenty-one gallons would be able to be used in gasoline and only about ten to twelve would be for diesel.

Student: Luke also cleverly leaves out how performance cars such as trucks actually are...

Kenneth: The rubric for the project is over half of their fourth marking period grade. The model and video, they both have a sixty point weighting. You've got the opposing argument, the rebuttal, I gave it thirty points.

Student: So that's ninety-eight percent of normal people every day are driving around gasoline engined cars.

Student: So diesel is the future and it a way better fuel--

Kenneth: All the notes that I take throughout the process could have been just a comment made, organization of their thoughts, or things that were directly defined in the rubric. Like part of it is using their opponent's video against them, so if I see evidence, then I write that down, so that I can go back and say, "Look, here's why I'm sliding it higher on the scale or why I didn't slide it higher, because I did not see this."

Marguerite: Kids own it, they want to know the information. Then they connect it to other things that they know and it's theirs. They retain it and they can do more with it.

Kenneth: As a teacher, I was trying to find a way to say, "You might not remember every test or every question I've ever given you, but you will not walk out of those school without remembering my class."

Student: You did good.

Student: Did I?

Student: Yeah.