



Energy Puzzles

Don Mackay, 12th Grade Science

High Tech High International

Our senior engineering students created jigsaw puzzles to introduce energy concepts to elementary age children. Each puzzle picture depicted a source or application of energy and included an age appropriate explanation laminated beneath the puzzle. The students printed their pictures using a cyanotype process and photosensitive paper prepared in class by mixing iron salts that react to form a deep blue dye (Prussian blue) when exposed to sunlight. The developed pictures were decouped to hardboard and cut into puzzle pieces with a laser cutter. A one page description of the energy represented by the picture was decouped to the puzzle frame under the pieces. During this project, students used their knowledge of how light interacts with matter to both create (with sunlight) and cut (with a laser) their puzzle pictures. They also learned to reframe a complex energy concept into a narrative engaging to a 5th grader. Students chose one of four roles: a researcher, an artist, a carpenter, and a chemist. Students assessed each other's product for quality of workmanship, technical accuracy, and adherence to the theme. The ultimate assessment however was the level of engagement on the part of the elementary school students to whom the puzzles were presented.

Teacher reflection

I was most surprised by how much more seriously the students took the project once they realized the final product would actually get used by 5th graders. There were many glitches that could have derailed the project but they repeatedly came up with creative solutions to make sure their puzzle would get delivered. The authenticity of the deliverable was the key. I also appreciated how this project integrated so many ideas and skills, from light to energy to chemistry to writing to carpentry.

Student Reflections:

It was interesting to try and explain wind turbines to a fifth grader. It made me think about exactly how a turbine works, and how to explain it in a simple way.
—Daniel

What I found most interesting was the way that light transfers energy based on the frequency of the light. I now think of this when I think of sun burns, plants, and photos. I enjoy learning things I can use to explain things in my life.
—Madison