

Rocket Car: Better Learning through PBL

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6th-8th grade Science & Sustainability

Introduction

I want more of my students to be self-directed and to remain engaged when the problems get complex. I want them learning science deeply by DOING science. I want to help them by focusing on timely feedback and supporting them individually and in small groups. While working at Raytheon, I noticed that almost everything was done in groups with regular checkpoints. They had to help each other solve problems and presented their progress to others. Research indicates that well-designed Project Based Learning (PBL) brings about these changes. PBL is a teaching method in which students gain both skills and knowledge by working for an extended period of time to investigate and respond to an open-ended and complex question, problem, or challenge.

I examined how the implementation of a PBL unit impacted my students' acquisition of content knowledge as well as their engagement. I created and implemented a 10-week PBL physics unit. Students were presented with an engineering design challenge: build the fastest "rocket-powered" vehicle. It was an iterative process whereby they largely taught themselves the physics concepts necessary for improving their vehicle.

Findings

Engaging students in PBL significantly increased their learning of science content. My students showed over three times more growth on a district benchmark assessment than students taught through a more traditional notes and quiz approach. Also, my non-advanced students gained as much or more than advanced students. I want to emphasize: This happened despite the fact I "taught" less than ever. They taught themselves! The use of PBL also drastically increased student engagement. After decades of teaching, I finally observed nearly too-good-to-be-true levels of mental and physical engagement. Students were not just on task but debating, thinking and building together.

Plan of Action

I will continue to use the Rocket Car PBL to teach Physics as well to give my students experience with practices commonly used in industry. I will also design PBL units for my other topics. Due to my particularly positive experience, I intend to spread the good word as far and wide as possible about the benefits of PBL.