

STEAM teacher uses robotics to help his science students take charge of their own learning!

With LEGO® MINDSTORMS® Education solutions, students are motivated to learn, observe, predict, and tinker with multiple science concepts.

About the Teacher:

- **Teacher:** Bill Church, classroom teacher, 15 years
- **School:** STEAM teacher at Profile Jr/Sr High School, Bethlehem, NH
Director of White Mountain Science Inc. (WMSI)
Adjunct Professor at Plymouth State University
- **Using LEGO® solutions for 11 years**
- **LEGO Education classroom solutions:**
LEGO® MINDSTORMS® Education RCX, NXT, and EV3

Finding ways to use robotics in his science classroom has never been a problem for Bill Church. With concepts such as force and motion, acceleration, friction, data collection and graphing, simple machines, energy, thermodynamics, and waves and vibrations, he is never without an activity or a challenge. However, Bill is more concerned with how students respond in the classroom than just whether or not they understand the concept. Robotics creates the kind of response that Church desires – engaged learners.

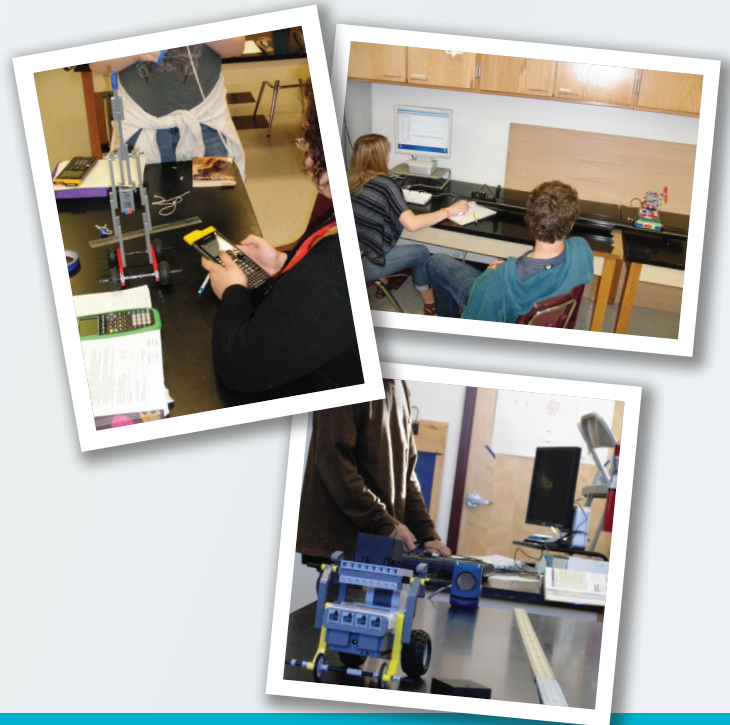
“I’m not as focused on a particular concept in science and whether I taught that concept well or if the students had the opportunity to learn that concept well; I’m more worried about the bigger picture. Are they active? Are they tinkering? Are they curious? Are they observing? This is the important stuff when learning science, and with robotics we have lots of opportunities to explore and practice these things,” he explains.

Church understands that iterative design is important in a science class. “With robots, students can model their idea quickly, test it, and iterate. It doesn’t take much time to iterate a design, so students accept failure as a step in the process,” said Church. And Church believes that students need to fail so that they can succeed. This success comes from trying different options and testing multiple solutions.

“Coming up with multiple solutions is very well facilitated by robotics in the classroom. As young learners, we believe that there is only one way to get the right answer. There is one way to do a math problem or answer a science fact

question, and that means with a group of 30 kids, you get the same answer. What’s awesome about robotics is that you are going to get 30 different answers,” Church explained. “When solving the problems of the real world in the 21st century, we need as many different answers as possible to assess multiple solutions to attack the big problems. It’s exciting in life when you can make your own stuff and be creative and when you give students the opportunity to come up with their own ideas and a diversity of solutions; this is the right way to do it.”

When students get to own their solutions, they pay more attention to what they are learning. This sense of pride enables Church to spend less time giving instruction and more time allowing his students to determine their own problems to be solved. “What I really enjoy about the LEGO Education solutions is that it doesn’t take much instruction to get them going on their own. Then I can spend more time supporting them as they explore their own ideas and make their own discoveries,” said Church.



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