

Physics is elementary, my dear Watson

Experimental physics + experiential teaching = a win-win for students and teachers



Nobel prize-winning physicist Richard Feynman designed a three-step process to help learners master any subject. The first step is to take out a blank sheet of paper and write out what one knows about it as if one were teaching it to a child. Feynman believed that complex words and jargon hide gaps in understanding and it is only when these are eliminated that true mastery can be demonstrated. Since the first publishing of his process, physicists worldwide have challenged each other and themselves accordingly: "If you can't explain it to a fourth or fifth grader, then you don't really know it."

Cascade High School AP Physics Teacher Sue Wilson challenged her students in similar fashion. She teamed up with fourth-grade teachers at Emerson Elementary School and fifth-grade teachers at Monroe Elementary School to give high school students the opportunity to do just that, explain their understanding of physics principals to fourth and fifth graders.

Monroe Elementary School teacher, Brian "Tick" Lagen, confided, "The entire floor of teachers here at Monroe was asking what was going on. When they saw over 30 high school kids coming in with all their gear, it was a sight!"

In two 50-minute sessions, pairs of Ms. Wilson's students taught small rotating groups of elementary school students the basics of pendulums, collisions, rotational motion, waves, forces, projectile motion, rotational inertia, electrical circuits and conductivity. These lessons were highly interactive, with elementary students engaged with experimentation and the measurement of results.

Monroe Elementary School student Sophie Atkinson shared she enjoyed how Cascade students "gave a visual representation of the topic we were learning about and then allowed us to interact with it." Fellow Monroe Elementary School student Tessa Hahn also appreciated "experimenting with the instruments the Cascade students brought and seeing what the result was afterward."

After the sessions were completed, fifth-grader Sophia Hopkins reflected, "The Cascade students enhanced my knowledge of forces such as gravity, friction and other things that were demonstrated at the rotations. They also increased my knowledge of collisions and inelastic and elastic combinations."

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The elementary students weren't the only ones who learned. Cascade High School's Abby Atlas shared, "We got to see things from a different perspective with the kids; we learned from them too." Ben Hansen assessed that while rewarding, "teaching requires a lot of energy." David Ngo said, "It was fun reviewing a physics concept and then applying it so others could learn." In a more serious tone, Cascade student Alex Smith commented on how teachers should continually work on perfecting their craft because they could "never know how much even a minor improvement" could help those being taught, and "that a single experience could influence a student's entire life."

Fifth-grade teacher Emily Brunswick-Nelson wrote, "The opportunity to engage in learning with students from Mrs. Wilson's physics class at Cascade High School was empowering. Students enjoyed having older peer mentors show them science in action through the interactive science experiment stations. For our fifth-grade students, it was an opportunity to make a connection between their current science and mathematics lessons and see how the information will be valuable in their future."

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