Team:
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Audience:
30 community college undergraduate transfer students beginning their term at UCSC

Venue:
WEST (Workshop for Engineering & Science Transfers), Chemistry strand; University of California, Santa Cruz; Sept 19-20, 2017

Description:

The content learning outcome was for our learners to be able to explain a molecular bonding phenomenon using an energy diagram and structural representation. The core practice that our activity focused on was improving a model with theory. We wanted our learners to be able to articulate which aspects of a phenomenon are important to include in a model, build upon simpler models to introduce a complex model, and to explain the phenomenon with multiple related models. By engaging in this content and practice, students will hopefully continue to develop their science identity, thereby making them feel part of the science community.
We had students raise questions by showing them chemical phenomena - such as molecules that appear different colors, or various chemical reactions. One aspect of our design that enhanced learners' content knowledge was having a thirty-minute expert introduction discussion using content related resources (handouts) and visualization of orbitals. Learners from each expert discussion group were asked to present a lightning lecture summary. After that, we started the investigation based on their highest interest from the raising question section. Learners were provided with different resources to pursue their investigations (paper, whiteboards, markers, clay, molecular model kits, handouts from expert introductions), which allowed them to brainstorm and engage in a variety of forms. For the culminating assessment task (CAT), we asked the learners to individually draw their final energy diagram and structural representation to indicate the important chemical outcome and provide a written rationale to explain their drawings. These were collected for scoring after the activity and were graded out of four points. The main content that we were looking for was 1) energy, 2) structure, 3) bonding, and 4) explanation.

Our team intentionally designed an equitable and inclusive science learning environment by focusing on the aspects of interest and recognition. Learners could investigate the chemical phenomenon that was most interesting to them. A point was made to recognize students' prior knowledge by having an open discussion during the expert introductions, where students could actively showcase their knowledge and contribute to teaching each other. As a group, the learners were willing to work together and accepted the challenge of investigating their chemical phenomenon.