Lesson plan for *Molecule Shapes*: Introduction

http://phet.colorado.edu

Learning Goals: Students will be able to: (information in italics is for teachers only and is not included on the student directions.)

- Identify substances to which "Molecular geometry" applies *(ie not ionic or metallic substances or elements, but covalently bonded molecules with one central atom)*
- Name molecule and electron geometries for basic molecules *(basic means- maximum six electron groups surrounding a central atom.)*
- Explain the model being used to predict molecule geometry *(repulsions between electron pairs or nuclei of bonded atoms –VSPER; electrons are not included in the molecular shape).*
- Predict common molecular geometry from the number of electron pairs and bonded atoms around a central atom of basic compounds. *(geometry includes bond angles, exclusion of lone pairs)*

Background:

Students will have done Build a Molecule 1 PhET. Before doing the activity, the students will have read some in their texts about molecules, will have done Lewis diagrams, and been introduced to a few compounds that have multiple bonds.

***Molecular Shapes* Introduction:**

Remind students what the central atom is. Also, tell them to read the directions carefully because they need to understand that the sim allows "attached groups" which mean lone pairs, single, double, or triple bonds. I will make sure to explain that the sim allows building molecules that we will not be learning about, but do exist.

The design team decided to allow many types of molecules because there are complex inorganic molecules for which this sim could be used. The maximum allowed is 6 "groups" of electrons where a lone pair, single, double, or triple bond counts as a group. That means that students will be able to build molecules that are generally not in HS or Gen chemistry texts.

Post-Lesson: I plan to use clicker questions included in this activity. For some of the questions, if I see that the distribution of answers was great, I demonstrated the sim to help students after the first clicker response before I made any comments. Then I would have a "revote". This stimulated lots of discussion between votes.