

Name _____

PhET Molecule Shape simulation

On a computer, chromebook, or phone go to

https://phet.colorado.edu/sims/html/molecule-shapes/latest/molecule-shapes_en.html

If you google “phet molecule shapes” it is normally the first thing to show up.

You should see a screen that says PhET Molecule Shapes with a small black screen with a circle and a play button. Hit the play button. You should come to an option of Model or Real Molecules.

Start with Model. You should notice to the bottom of the screen you can flip to Model/Real Molecule/Home.

Check the boxes for molecular geometry, electron geometry, and show bond angles.

Add a single bonded atom by clicking on the top icon in the Bonding menu (it has a single line with an atom on the end). Add a double bonded atom by clicking on the icon with two lines, and a triple bonded atom by clicking on the icon with 3 lines. Remove atoms by clicking on the x next to the icon. Add a Lone Pair (of electrons) by clicking on Lone Pair. Once you click on Lone Pair, you can uncheck the box Show Lone Pairs to hide the electron pairs or show them. You can spin the molecule around to get a different view.

Build a few molecules with the simulation for a bit to familiarize yourself with these controls.

Click Remove All to have only 1 central atom on the screen. Click the orange circle to return to the beginning linear molecule setting.

1. What is the difference between Molecular Geometry and Electron Geometry? Add a Lone Pair if you don't see it.

2. **Draw the Lewis Dot Structures** for the following molecules **Determine the Shape and Bond Angle**. Compare this to ones on this by clicking on Real Molecules. Important to note real molecules will be slightly off real measured values. I only want you to know the model values for the test.

H₂O

CO₂

SO₂

XeF₂

Xe breaks the octet rule

BF₃

B breaks the octet rule

ClF₃

Cl breaks the octet rule

NH₃

CH₄

SF₄

S breaks the octet rule

XeF₄

Xe breaks the octet rule

BrF₅

Br breaks the octet rule

PCl₅

P breaks the octet rule

SF₆ S breaks the octet rule