

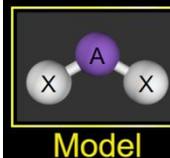
CLICK!

 Molecule Shapes - Molecules, VSEPR, Bonds - PhET
<https://phet.colorado.edu/.../molecule-sha...> University of Colorado Boulder
 Explore molecule shapes by building molecules in 3D! How does molecule shape change with different numbers of bonds and electron pairs? Find out by ...

Click to run in



Molecule Shapes



Set-up: Choose "Model"

Check the two "Name" tools and the "Show Bond Angles" box.

Name

Molecule Geometry Electron Geometry

Linear Linear

Options

Show Lone Pairs

Show Bond Angles

Play with the sim adding bonds and lone pairs.

Part 1 Directions: Draw pictures of 4 different molecules you create using bonds and lone pairs. Record geometries and angles, below.

Picture 1	Picture 2	Picture 3	Picture 4
Molecule geometry	Molecule geometry	Molecule geometry	Molecule geometry
Electron geometry	Electron geometry	Electron geometry	Electron geometry
Bond angles	Bond angles	Bond angles	Bond angles

Part 1 Questions:

- How many bonds can you add total? _____
- How many lone pairs can you add total? _____
- How many bonds and lone pairs can you add total? _____
- How can you make the molecule geometry be DIFFERENT than the Electron geometry?
- Molecules have shape! Drag and rotate them around.

Which molecule geometries are 1D or 2D? (give at least 3!)	Which molecule geometries are 3D? (give at least 3!)

Part 2 Set-up: Click

Molecule Shapes

Check boxes:

Molecule Geometry Electron Geometry

Bent Tetrahedral

Molecule: ▼

Molecule: ▼

Options

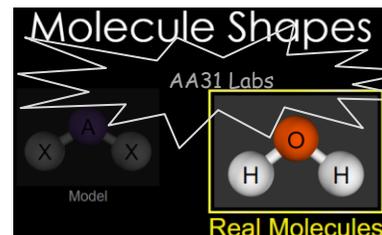
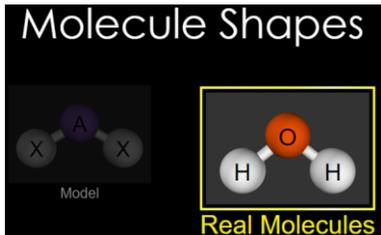
Show Lone Pairs

Show Bond Angles



Part 2 Directions: Turn molecules around with mouse. Describe each molecule in the table, below

				NH ₃
				CH ₄
				SF ₄
				XeF ₄
				BrF ₅
				PCl ₅
				SF ₆



Part 2 Questions:

1. Can you change the shape of the molecules by twisting them around?

Y or N

2. What happens to the molecules you dragged and twisted?

3. Are the bond angles in part 1 the same as the bond angles in part 2? Why do you think that they are the same/different?

Going Further:

4. Why do you think you cannot get more than 6 things around the central atom?
5. Organic molecules (like CH_4) have carbon as the central atom. How many bonds can a carbon central atom support?
6. Is CH_4 planar (2D)?
7. DNA is a large organic molecule that has a shape described as a “double helix” shown in a cartoon, right. Given what you know about the carbon molecule’s geometry (Q6) does this shape make sense? Why or why not?



Name _____
Period _____
Date _____

