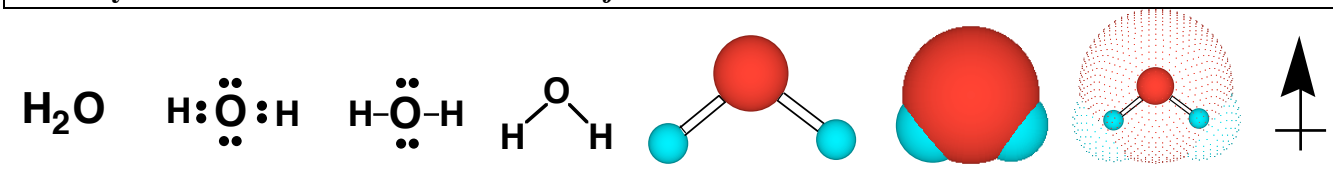
Meeting 1 – Sept. 6 **THESE ARE RESPONSES TO THE ACTIVITIES OF MEETING 1, IN ADDITION TO A FEW NOTES THAT I DID NOT HAVE TIME TO COVER THAT DAY.

Activity 1. What do you already know about water? Make a list of descriptions and/or make drawings

What was most expected? **H_2O**!
What was most surprising? You didn't have many, except **Polar**??!!

Activity 2. Which are models of water? ***All of them!***



These are the types of models displayed above:
Line formula - Lewis dot structure - Structural diagram - Ball and Stick diagram - Space filling - Van der Waals radii - dipole

Activity 3. Now make N, C, S, and Ne atoms similarly happy ☺

C has 4 valence e-;
it wants 4 more e-;
it makes 4 bonds to H
This is methane.

N has 5 valence e-;
it wants 3 more e-;
it makes 3 bonds to H
This is ammonia.

S has 6 valence e-;
it wants 3 more e-;
it makes 2 bonds to H
This is hydrogen sulfide.
Note how this is like water.

Ne has 8 valence e-;
it's happy all by itself!
Just neon!

Anything wrong with your models of happy N, C, S and Ne molecules?

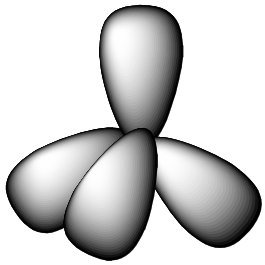
I was thinking of the fact that the Lewis electron dot structures (i.e. models) as drawn above imply incorrect geometries. Lewis dot structures don't really say anything in themselves about geometry.

What is the shape of your molecules? ***What is their structure?***

Some Notes For Structural Models:

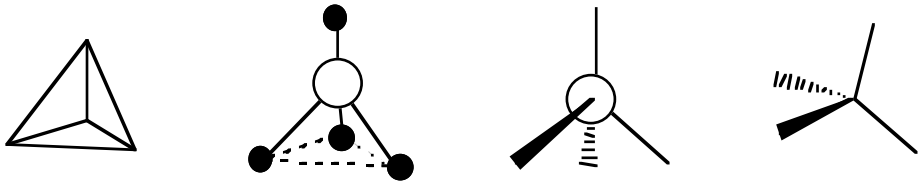
Structure is determined by one fundamental: **Repulsion** is origin of most of structures.
Think about it: repulsion is the "flip side" of 'opposites attract'

Imagine 4 electron pairs behaving like 4 balloons— each balloon requires space, pushes others away:

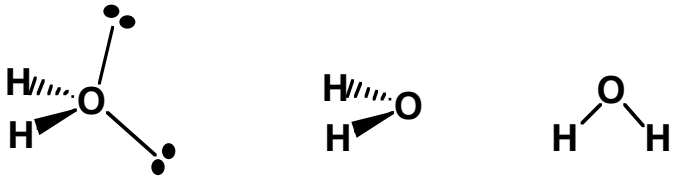


The shape that 4 electron pairs— or 4 balloons—take to minimize repulsion is the tetrahedron.

Other ways to draw tetrahedral shapes:



The shape of water derived from a tetrahedral O atom:

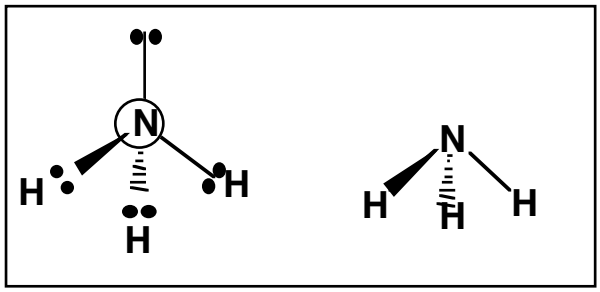


all valence electrons shown: tetrahedral

only atoms shown: a bent structure

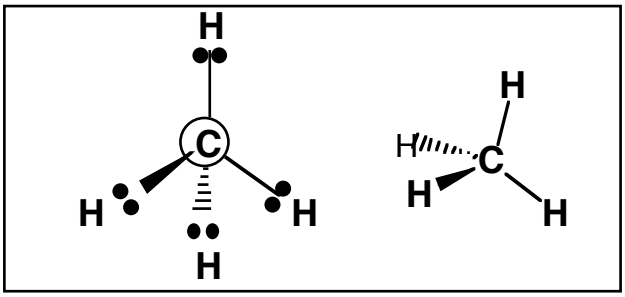
Activity 4: Build shapes of NH_3 and CH_4
. on paper and also with model kit

4 e- pairs around N, 3 N-H bond pairs and one lone pair in tetrahedral arrangement.



← looking only at atoms, a trigonal pyramidal shape

4 e- pairs around N, 3 N-H bond pairs and one lone pair in tetrahedral arrangement.



← looking only at atoms, a tetrahedral shape molecule