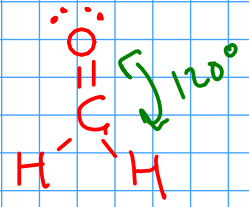
Examples:

H_2CO

H : 1x2
C : 4
O : 6
| 12

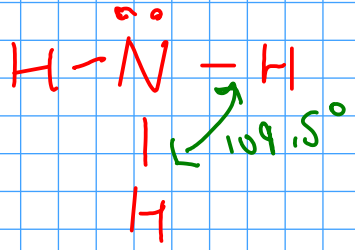


What about shape? TRIGONAL PLANAR. There are THREE THINGS (=O, -H, -H) around the central carbon.

Polarity? POLAR, because the C=O bond is polar and not "canceled" our by any other equivalent bonds.

NH_3

N : 5
H : 1x3
8

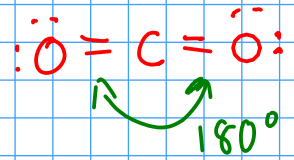


Shape? PYRAMIDAL ...There are four things around the nitrogen center, but only three of them are atoms. Since we name shapes based on the arrangement of ATOMS, we call this pyramidal instead of tetrahedral.

Polarity? Since the N-H bonds are polar, and nitrogen is at the top of the "pyramid", we'd expect that the nitrogen end of the molecule would have a slight negative charge. POLAR

CO_2

C : 4
O : 6x2
16



Shape? LINEAR. Only two things around the central carbon atom, so we expect them to be 180 degrees apart.

Polarity? C=O bonds are polar, HOWEVER they are arraged symmetrically in this molecule. They cancel each other out, so we expect a NONPOLAR molecule.

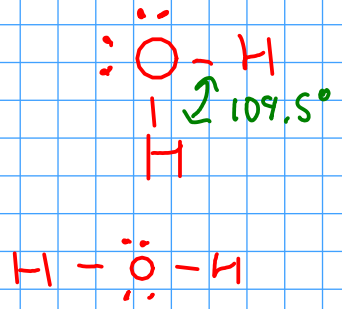
EXAMPLES

Water, H_2O

H: 2 x 1

O: 6

8



Shape? Even though there are four "things" around the central oxygen, only two of them are atoms. So we describe this as "BENT".

Polarity? POLAR. O-H bonds are polar, and we would expect that the oxygen side of this molecule would have a slight negative charge, while the hydrogen side would be positive.

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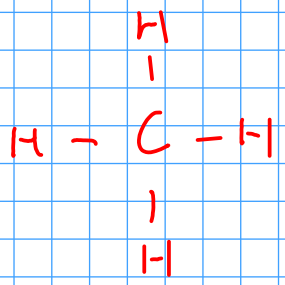
methane, CH_4

C: 4

H: 4 x 1

8



Shape? TETRAHEDRAL. Four H- around the carbon center.

Polarity? NONPOLAR (1) - C-H bonds are nonpolar (2) Even if they WERE polar, they're symmetrical. They would cancel each other out.

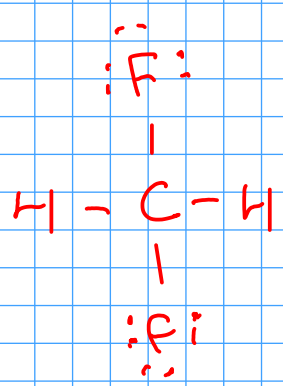
CH_2F_2

C: 4

H: 2 x 1 = 2

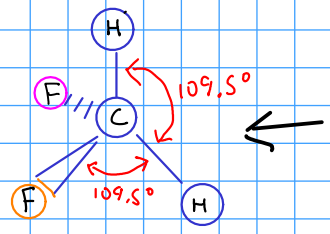
F: 2 x 7 = 14

20



Shape? TETRAHEDRAL, just like methane

Polarity? POLAR. In three dimensions, we can clearly see that this molecule has two distinct sides. Electrons are pulled towards the fluorine side.



It's easier to see these "sides" in the 3D view drawn here.