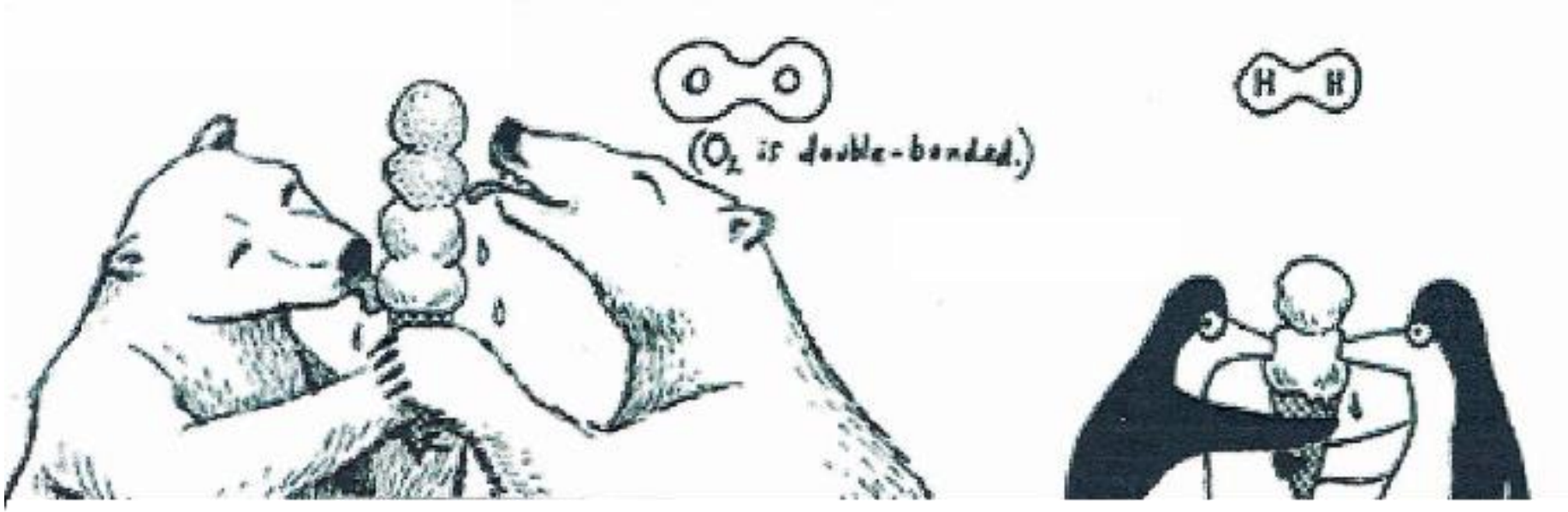
# N-20
# Polarity

**Target: I can use the 3-dimensional shape of a molecule, and the electro negativities of the elements to determine the polarity of the molecule.**

**Link to YouTube Presentation:** https://youtu.be/8yHUe42Y0Mw

# What's happening inside covalent molecules like $O_2$ or $H_2$?

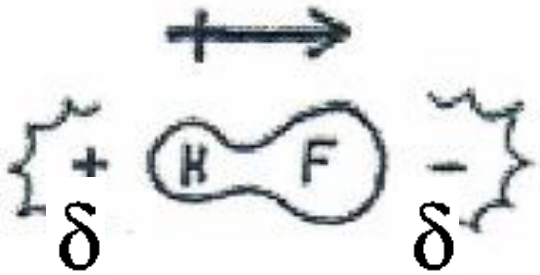
Electrons are shared *equally*



**Example:** HF

HF is covalent but electrons are *not* shared equally

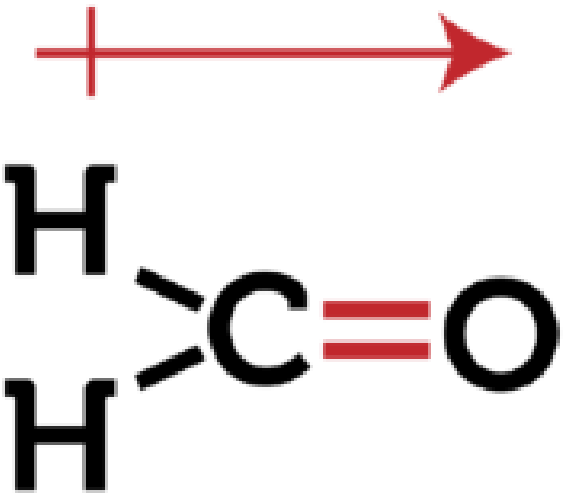
**Molecules become *POLAR* when electrons are not shared equally**

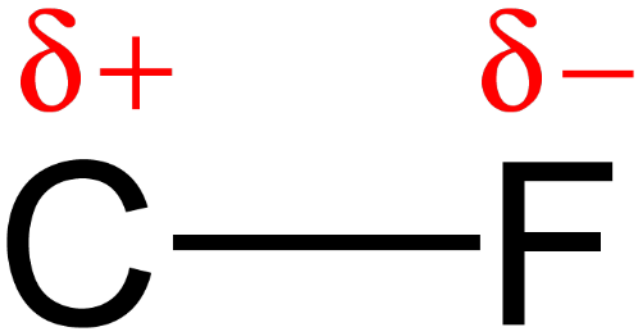


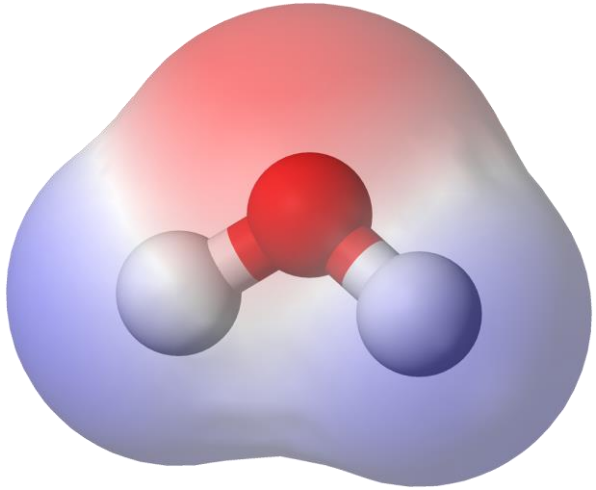

"partial positive"

"partial negative"

# Three ways to diagram “dipoles”



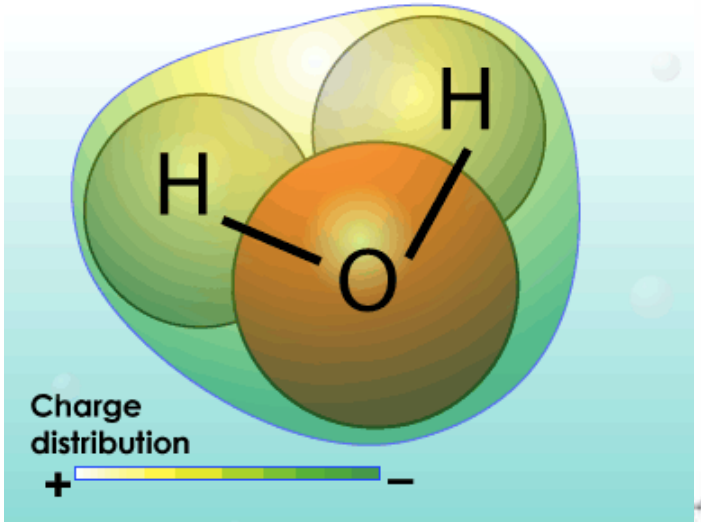
# Polar molecules with more than 2 atoms

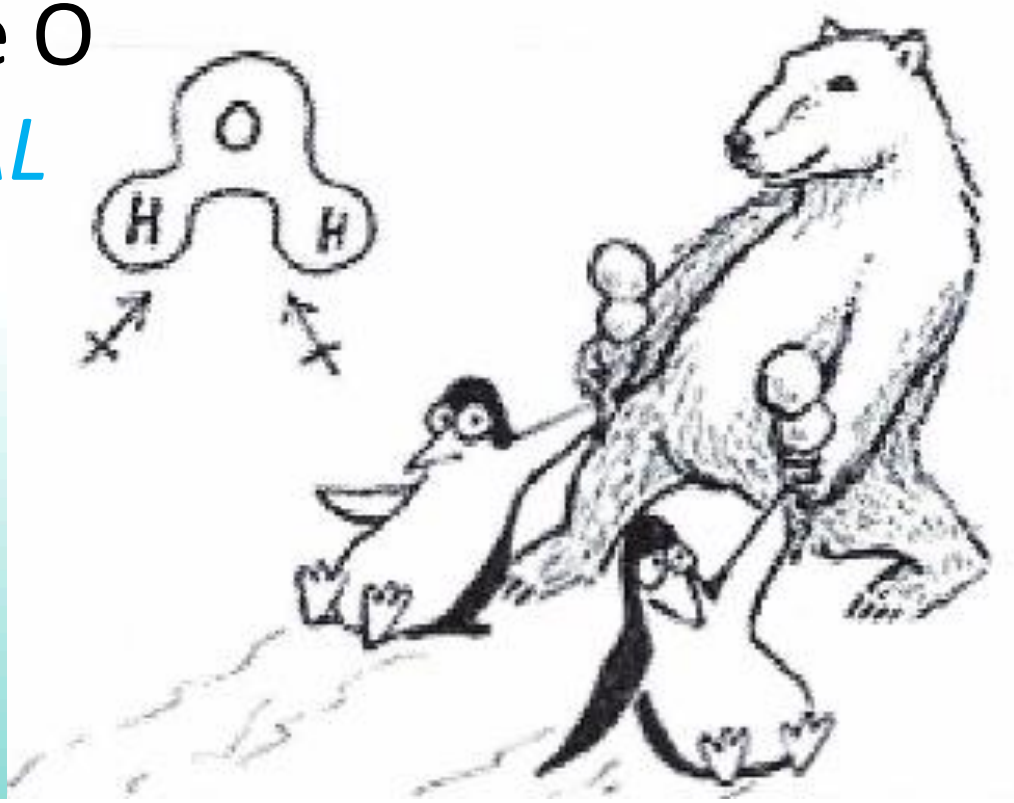
## Water has:

2 H's willing to almost give up electrons

1 electronegative O

*Ends up UNEQUAL*

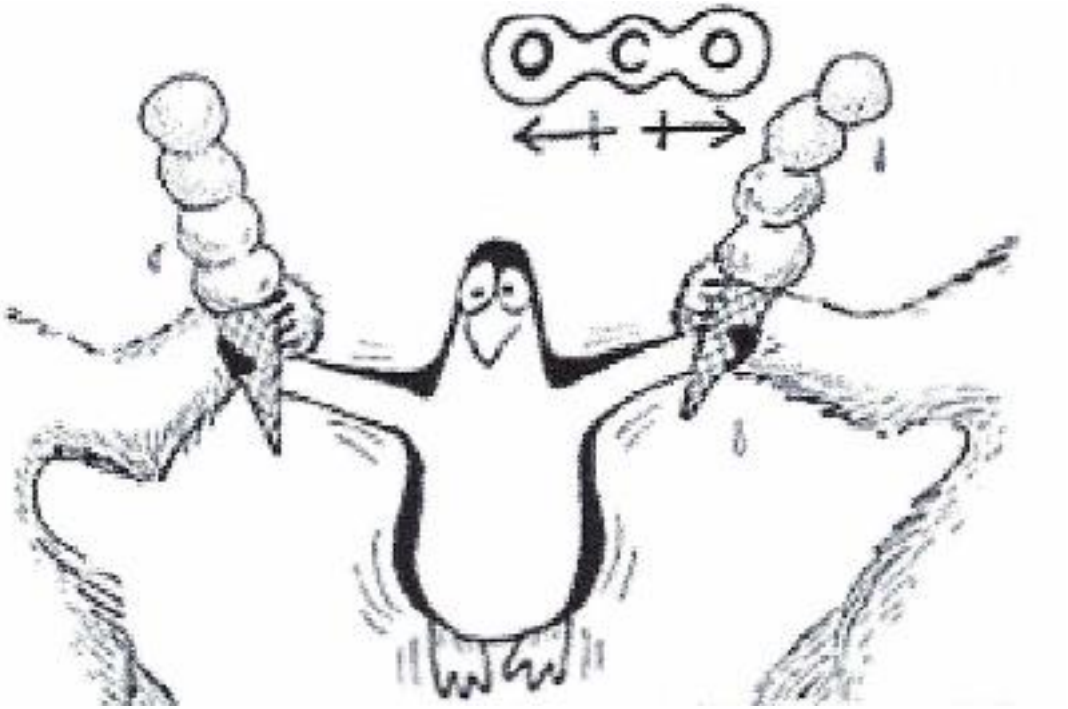


# Symmetry…the pole destroyer!

$CO_2$

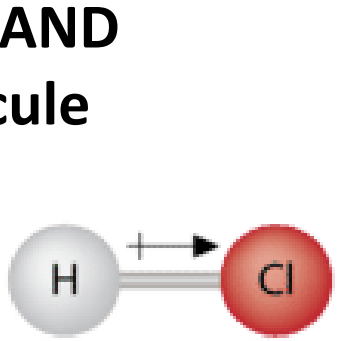
Has 1 carbon surrounded by 2 electronegative Oxygens, but is NOT polar?!?!

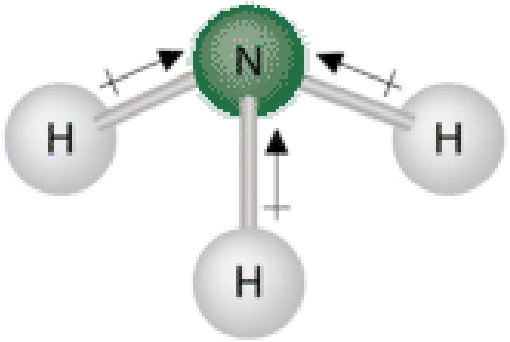


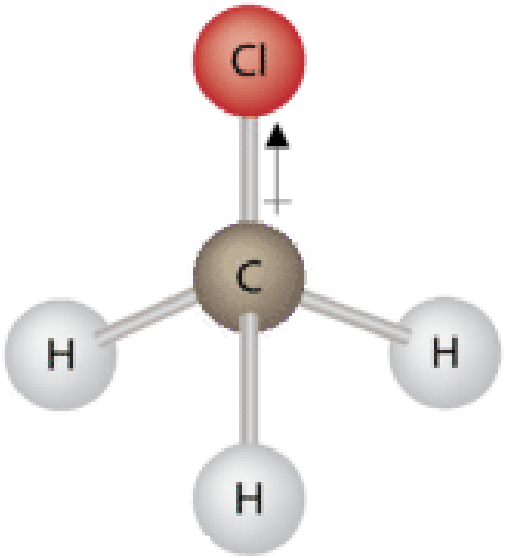

Electron density is still SYMETRICAL which makes it a non-polar molecule

# Careful about polar BOND versus polar MOLECULE

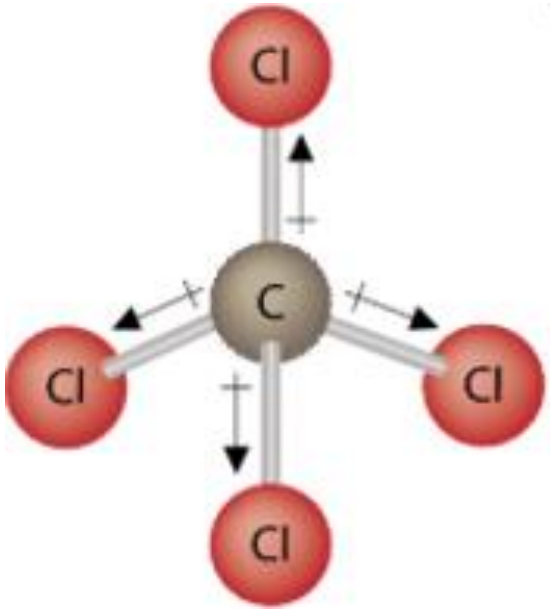
**Polar bond AND Polar molecule**

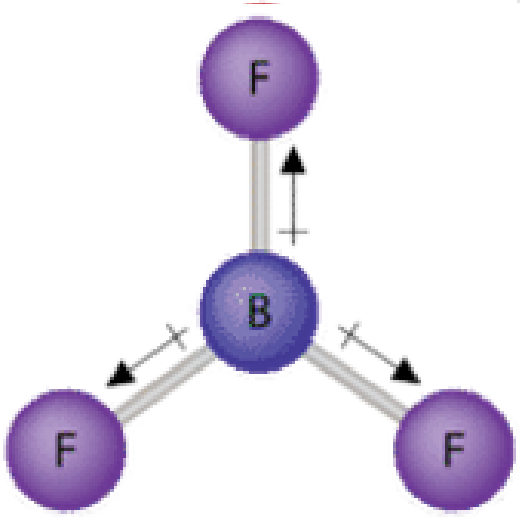


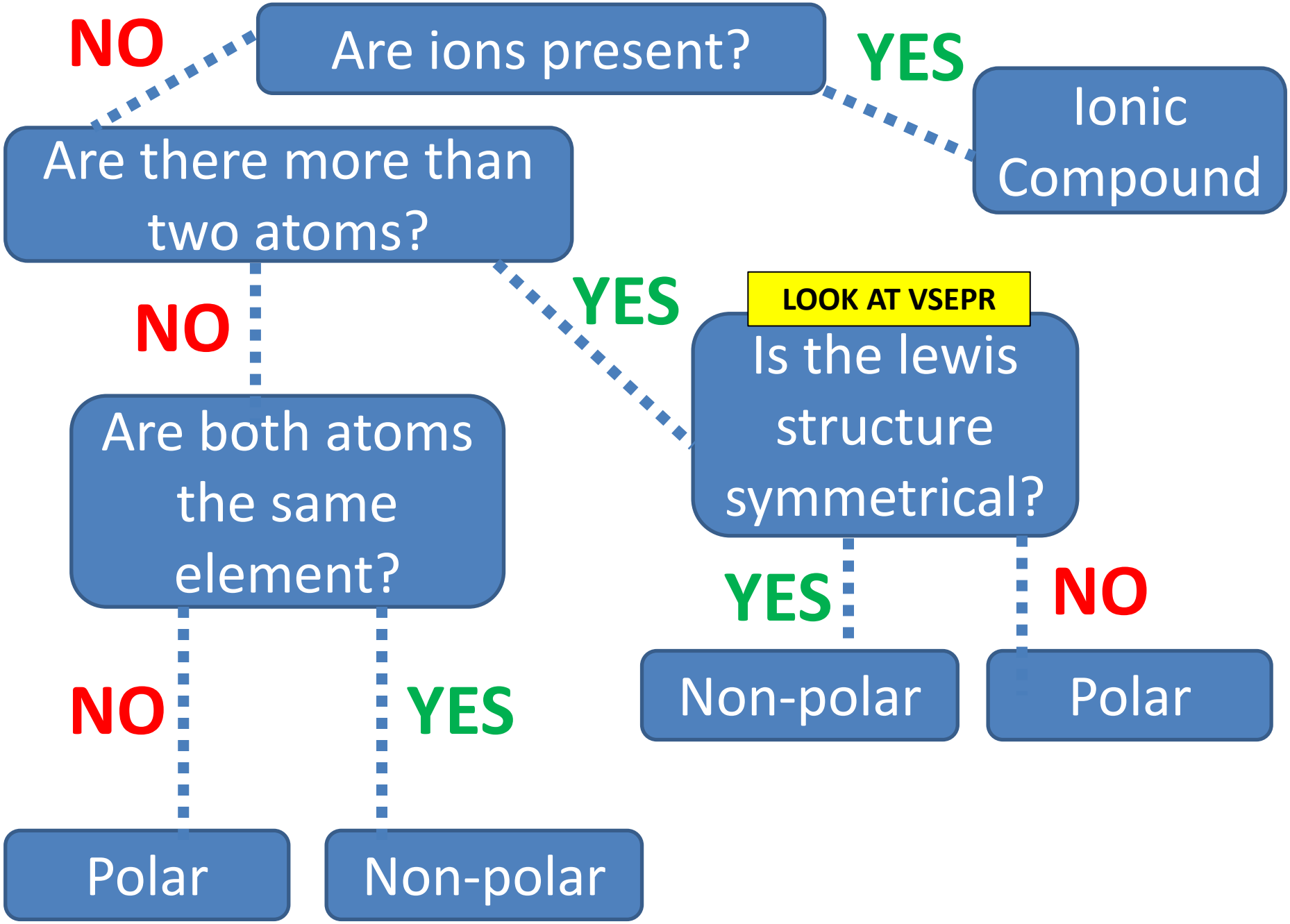



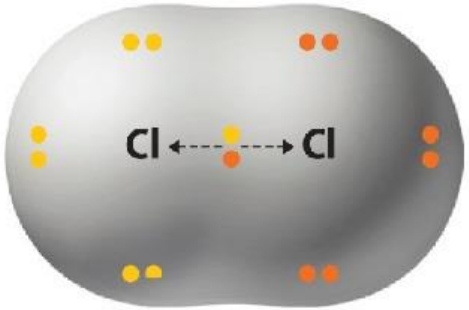

**Polar bond and NON-polar molecule**




NO
Are ions present?
YES
Ionic Compound
Are there more than two atoms?
YES
LOOK AT VSEPR
Is the lewis structure symmetrical?
NO
Are both atoms the same element?
YES
NO
Non-polar
NO
Polar
NO
YES
Polar
Non-polar

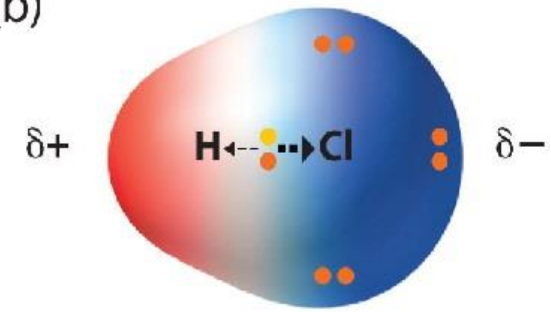
(a)




**Nonpolar covalent bond**

Bonding electrons shared equally between two atoms.
No charges on atoms.

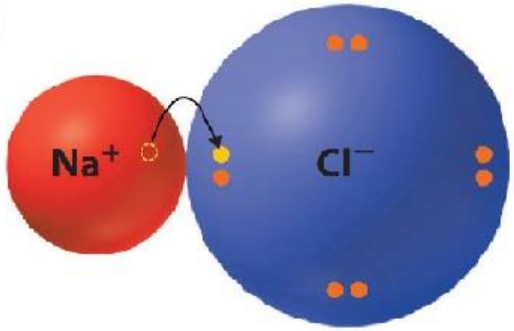
(b)




**Polar covalent bond**

Bonding electrons shared unequally between two atoms.
Partial charges on atoms.

(c)




**Ionic bond**

Complete transfer of one or more valence electrons.
Full charges on resulting ions.

**YouTube Link to Presentation**

https://youtu.be/8yHUe42Y0Mw