

### Covalent bonding:

Forms when electrons are shared bet. atoms

Use Lewis structures to represent structure of the molecule formed

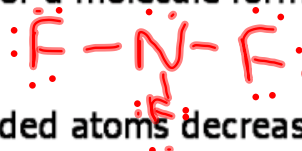
bonding electrons are represented by a line bet. atoms

single bond—1 pair electrons are shared

double bond—2 pairs electrons are shared

triple bond—3 pairs of electrons are shared

Draw the Lewis structure for a molecule formed between nitrogen and fluorine



The distance between bonded atoms decreases as the number of shared pairs of electrons increases.

**Polar covalent bond:**

Forms when electrons are not shared equally bet. atoms

Molecule formed has a positive end and a negative end  
(form a dipole)

Polarity of the molecule is due to the attraction that the atoms  
have for the electrons (electronegativity).

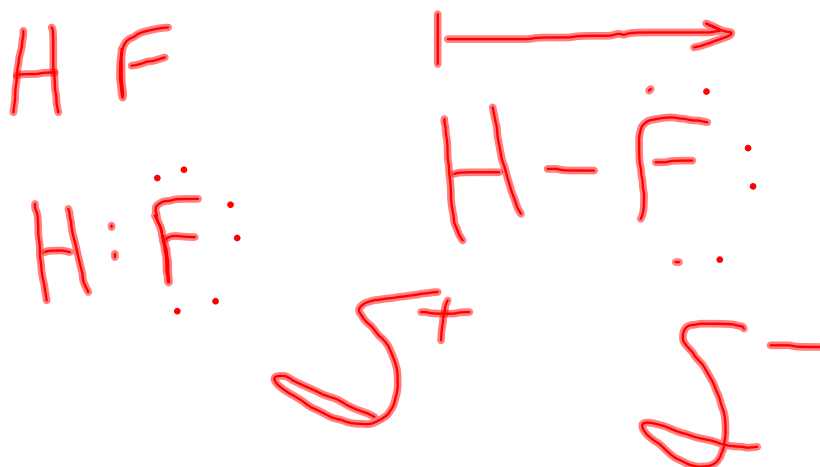
**Electronegativity:**

Linus Pauling

Scale: 0-4

Measure of the attraction an atom has for electrons

Increases across a period and decreases down a  
group or family



electronegativity difference determines ionic character of a covalent bond:

0-.4 nonpolar bond (electrons are = or almost = shared)

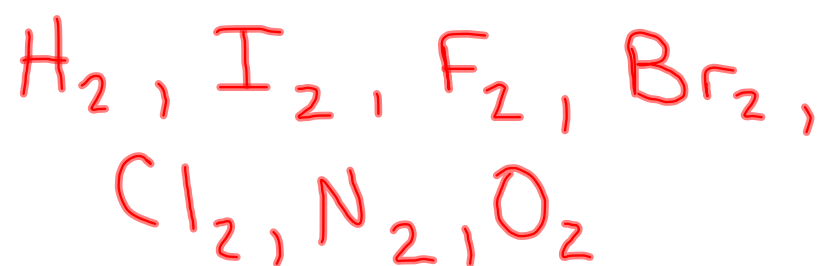
.4-1.7 polar

> 1.7 ionic (polar covalent bond with a lot of ionic character)

Less electronegativity atom written first in the formula for the compound/molecule

Nonpolar covalent bond:

Electrons are shared equally bet. 2 atoms of the same element.



Draw the Lewis structure for HF and H<sub>2</sub>O and determine the ionic character of the bonds.

Show the direction of the bond polarities and indicate which molecules have a dipole moment: HCl, Cl<sub>2</sub>, SO<sub>3</sub>, CH<sub>4</sub>, and H<sub>2</sub>S.

Coordinate covalent bond -  
in polyatomic ions  
one atom donates a  
PR.  $e^-$