

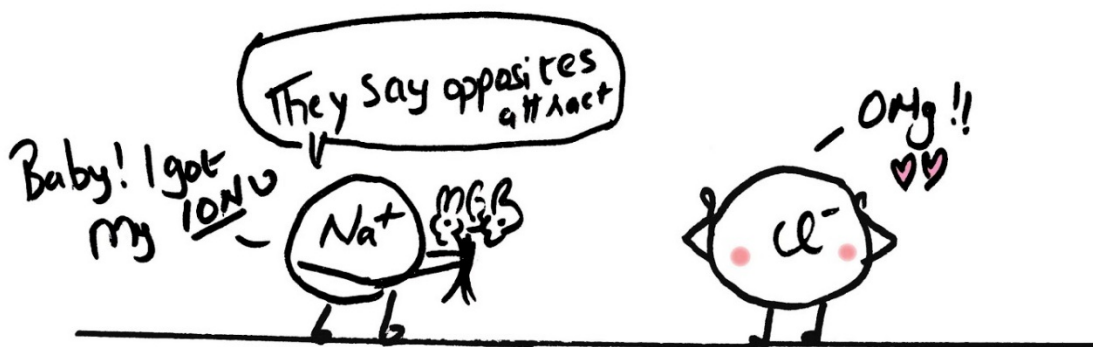
## Homework check!!!

Please staple papers in the following order and turn-in:

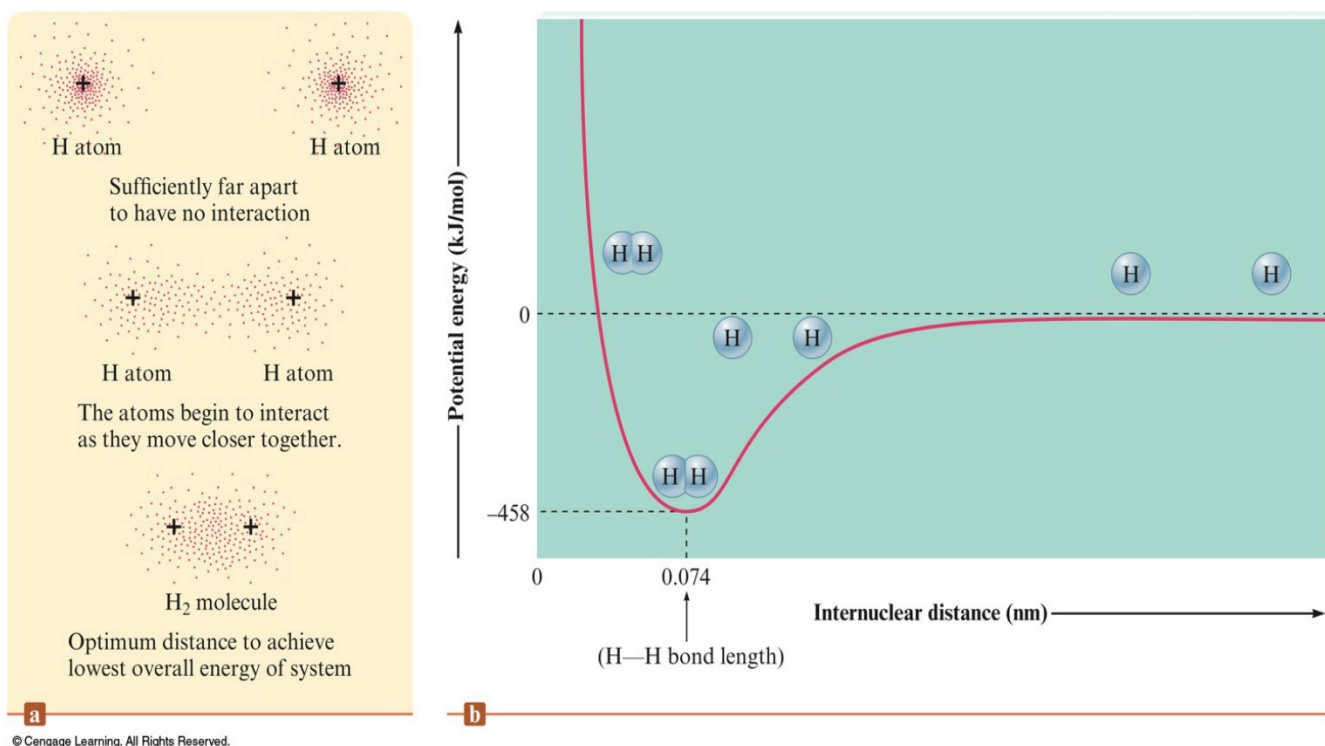
- 1) Ch. 7.1-7.3 notes
- 2) Ch. 7.11-7.12 notes
- 3) Ch. 7 exercises #39, 41, 43, 45, 83, 85 & 91
- 4) Ch. 7 exercises #97, 103, 105, 107, 109, 113, 115 & 125
- 5) Ch. 8 exercises #41, 45, 47, 49 & 53
- 6) Ch. 8.1-8.5 notes
- 7) Ch. 8.6-8.13 notes
- 8) Ch. 8 exercises #27, 29, 31, 33, 35 & 37

After the quiz, answer these questions on a sheet of paper:

1. Why do atoms bond?
2. Is energy absorbed or released when a chemical bond is broken? Explain your reasoning.
3. Draw a Lewis structure for each molecule:  $F_2$ ,  $O_2$ , and  $N_2$ .



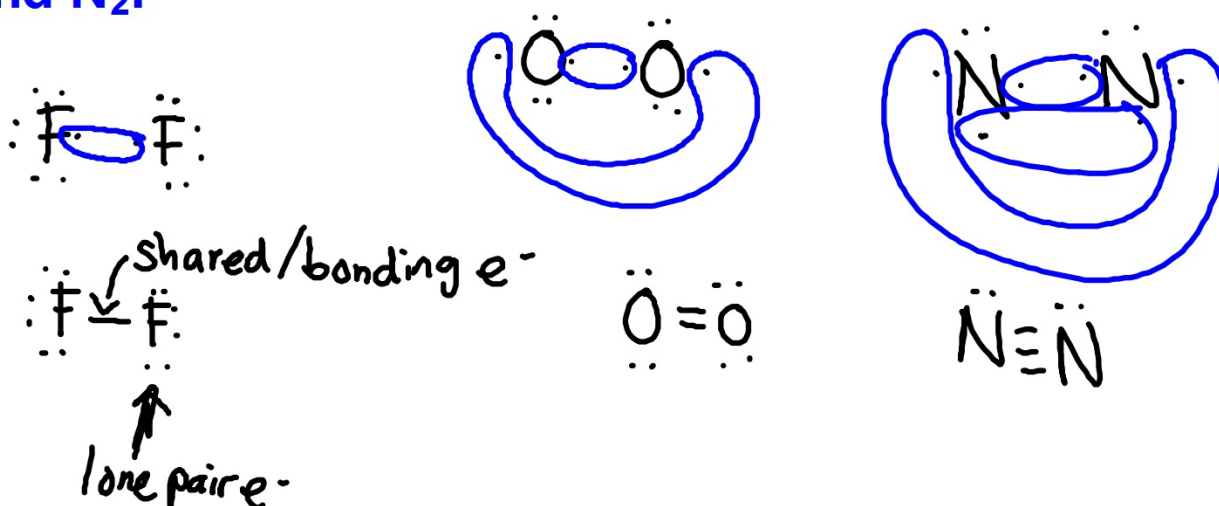
**A bond forms between two atoms if the energy of the two atoms together is lower than when the atoms are separate**



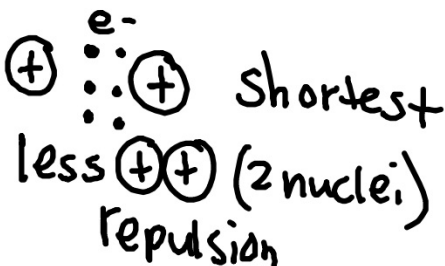
**Bond energy** - energy needed to break a bond;  
indicator of bond strength

**Bond length** - distance between two atoms where  
potential energy is minimal

**Draw the Lewis structures for molecules of F<sub>2</sub>, O<sub>2</sub>,  
and N<sub>2</sub>.**



## Bond order, bond strength and bond length

Bond Type	Bond order	Bond strength	Bond length
single 2 e <sup>-</sup> shared	1	weakest	⊕ ·· e <sup>-</sup> ·· ⊕ longest
double 4 e <sup>-</sup> shared	2		
triple 6 e <sup>-</sup> shared	3	strongest	

## Bond energy data

F - F single bond: 154 kJ/mol

O = O double bond: 495 kJ/mol

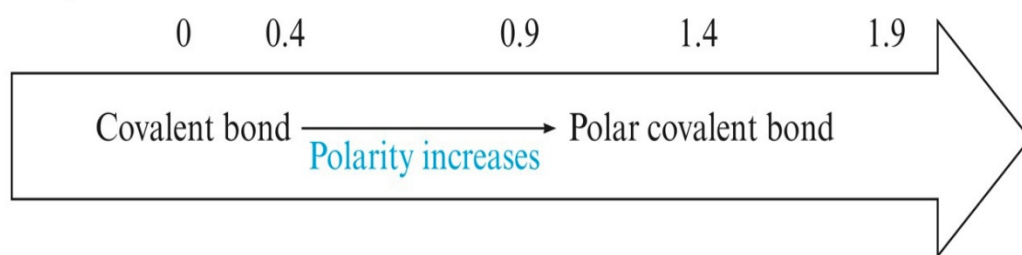
N ≡ N triple bond: 941 kJ/mol







Electronegativity  
difference

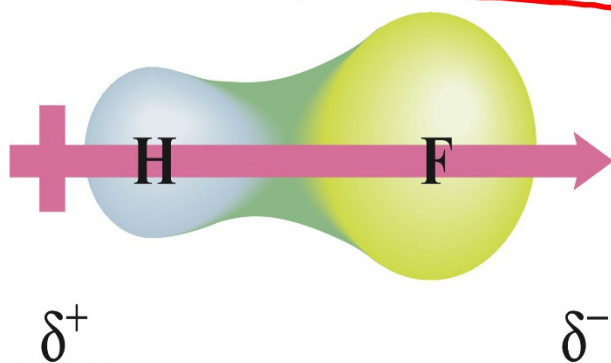


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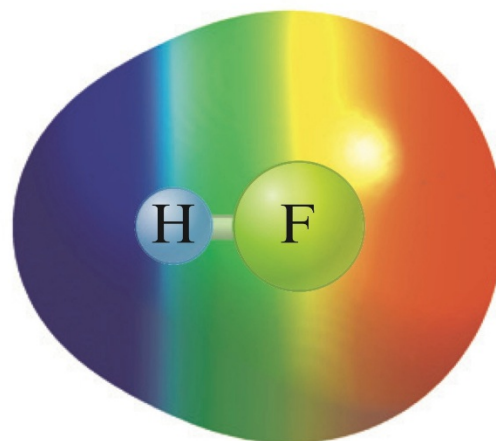
**Dipole moment** - exists when a molecule has a positive end and a negative end (**dipolar** - **two poles!**)

- there is an **unequal** distribution of charge throughout the molecule

- results in a **polar molecule**

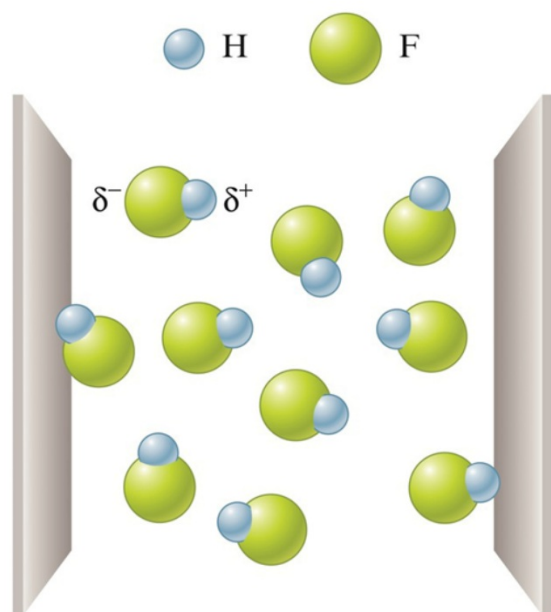


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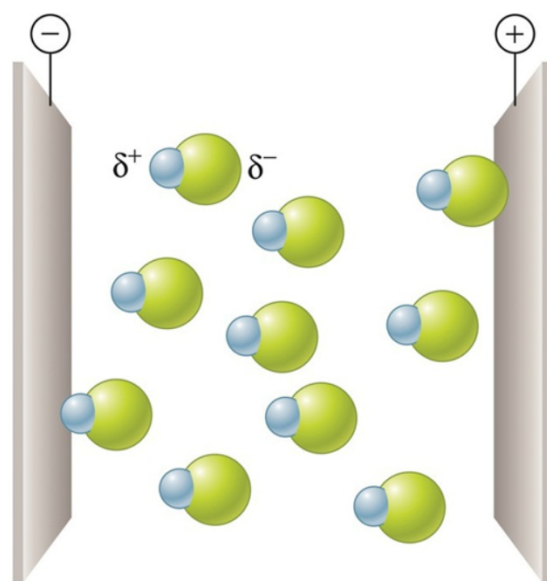


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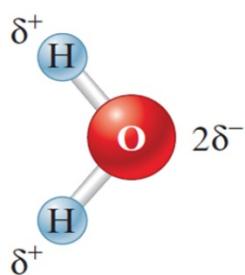
# Polar molecule orientation in the presence of an electric field



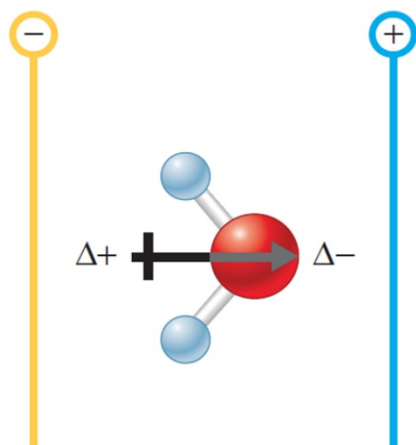
**a**  
No electric field



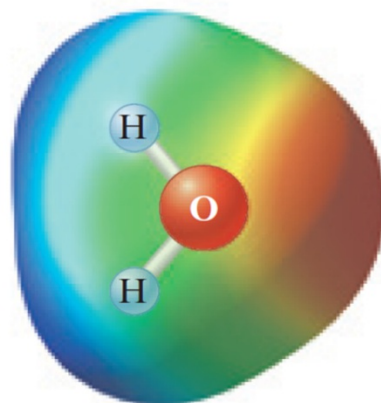
**b**  
Electric field



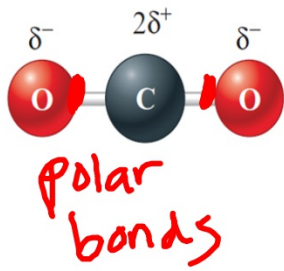
**a**



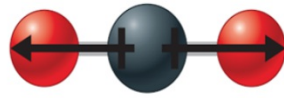
**b**



**c**

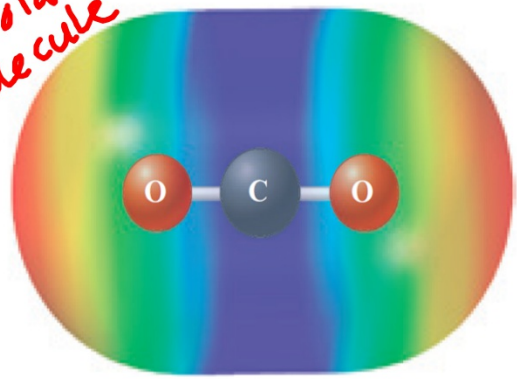


**a**

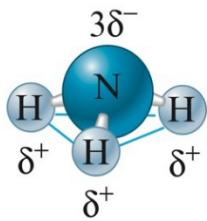


**b**

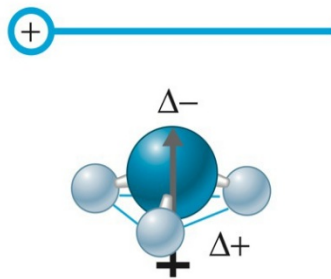
*non polar molecule*



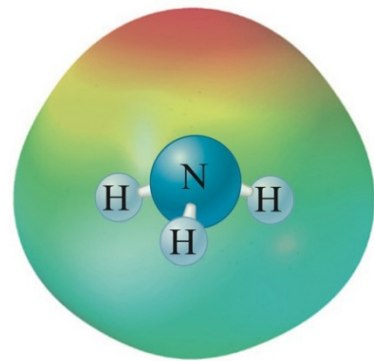
**c**



**a**

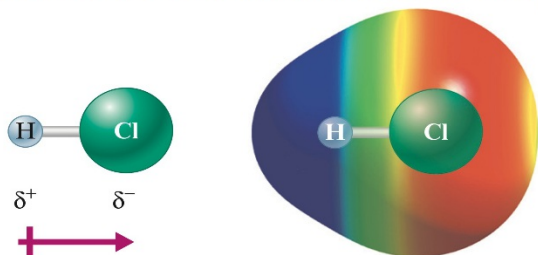


**b**

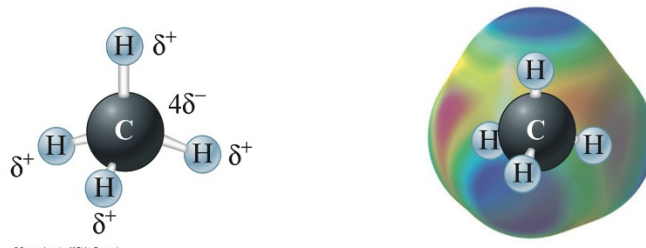


**c**

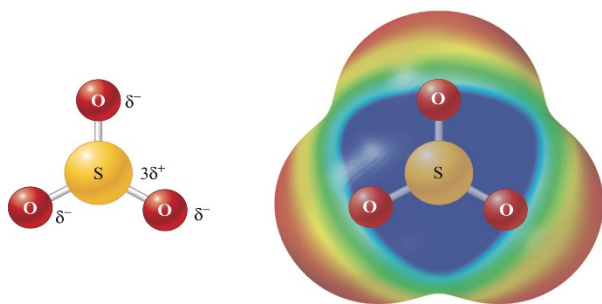
Which molecules contain polar bonds? *a, b, c, d*  
Which molecules have a dipole moment? *a, d*  
Which molecules are polar? *a, d*



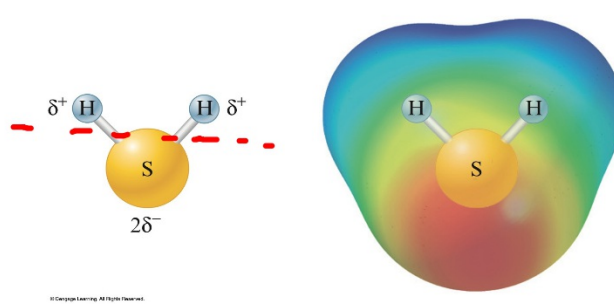
(a) HCl



(b) CH<sub>4</sub>



(c) SO<sub>3</sub>



(d) H<sub>2</sub>S