This week in Chem110

- We will use our understanding of orbitals/electronic configurations to:

- Determine how bonds are formed

- Understand why there is a difference in the types of bonds

- Compare bond strengths between different bonds

- Draw 2-dimensional representation of covalent bonds in simple molecules

Which of the following has higher lattice energy?

CsCl or MgCl$_2$ **KCl or CaS**   **RbI or NaBr**

Please use this periodic table (also posted on myCourses)

Practice Question 2

Compare the bond energy and bond order of the following:

A   **C—O**   **C=O**   **C≡O**

B   **C=C**   **C=N**   **C=O**

C   **H—F**   **H—Cl**   **H—Br**   **H—I**

Practice Question 3

Based on the figure below (for NH_2-NH_2 and N_2), answer the following questions:
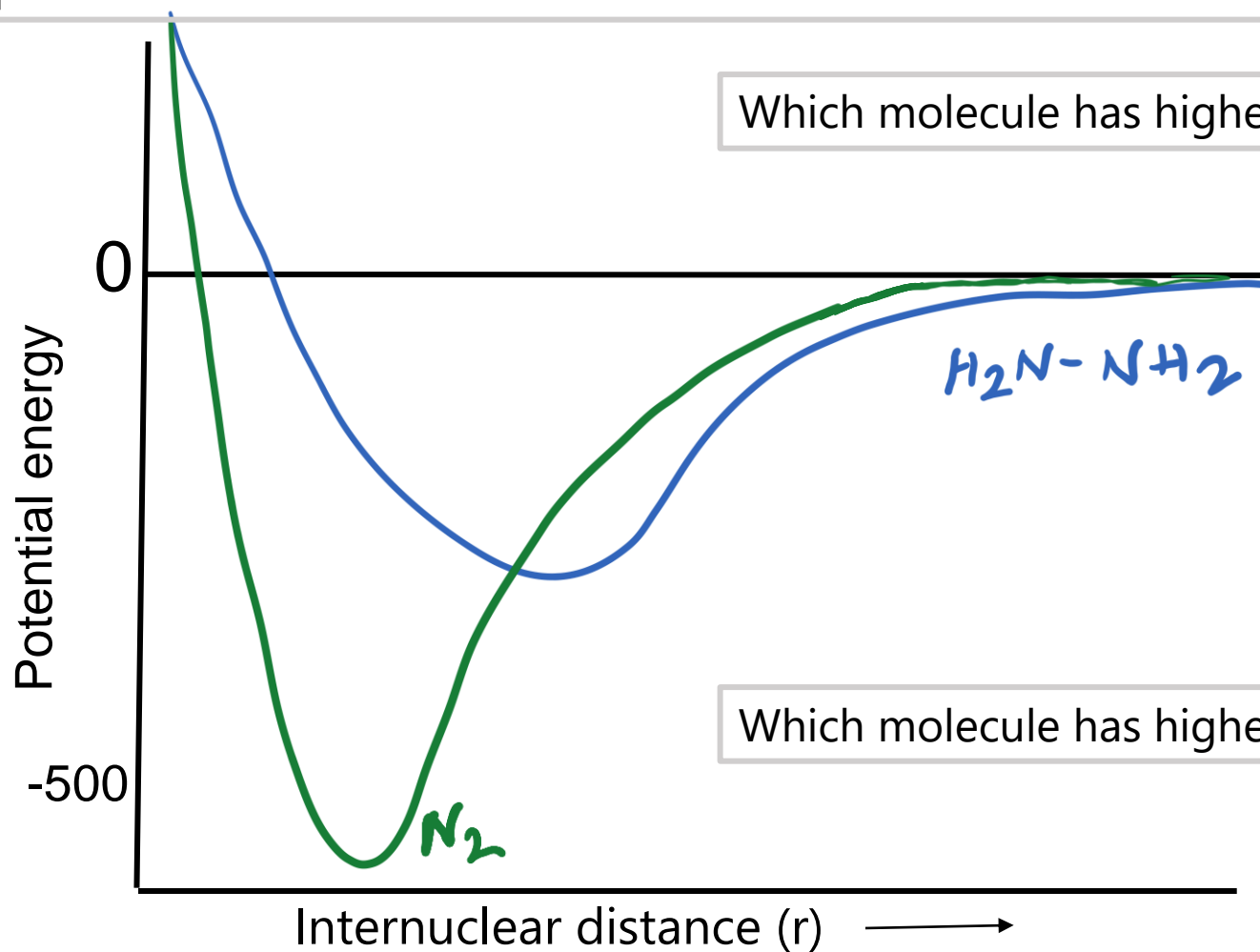
Which molecule has higher **bond energy**?

H_2N-NH_2

Which molecule has higher **bond length**?

N_2

0

-500

Potential energy

Internuclear distance (r) ⟶

Practice Question 4

Practice the Lewis Structure for the following molecules:

H_2O H_2 O_2

Practice Question 5

Calculate the enthalpy of reaction for the following reaction

$$2H_2O \ (l) \longrightarrow H_2 \ (g) + O_2 \ (g)$$

BOND ENERGIES:

H−H: 436 kJ

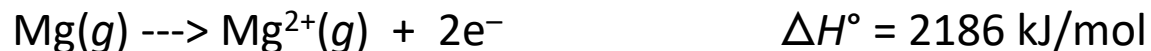**O=O: 498 kJ**

O-H: 464 kJ

Practice Question 6

Calculate the lattice energy of magnesium sulfide from the data given below.

$Mg(s) \text{ ---> } Mg(g)$ $\Delta H° = 148$ kJ/mol

$Mg(g) \text{ ---> } Mg^{2+}(g) + 2e^-$ $\Delta H° = 2186$ kJ/mol

$S_8(s) \text{ ---> } 8S(g)$ $\Delta H° = 2232$ kJ/mol

$S(g) + 2e^- \text{ ---> } S^{2-}(g)$ $\Delta H° = 450$ kJ/mol

$8Mg(s) + S_8(s) \text{ ---> } 8MgS(s)$ $\Delta H° = -2744$ kJ/mol

Label the polar covalent bonds in the structures below, indicate δ+ and δ–.
Which bond is the *most* polar? (Use the Datasheet – posted on myCourses has the electronegativity chart)
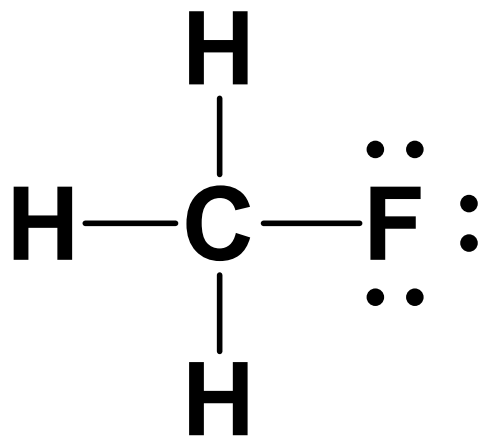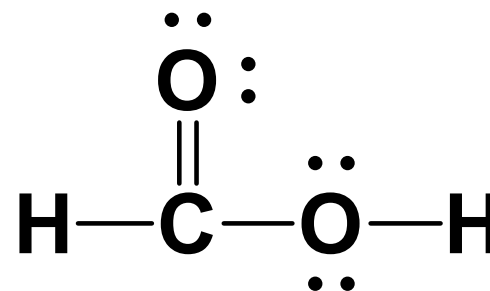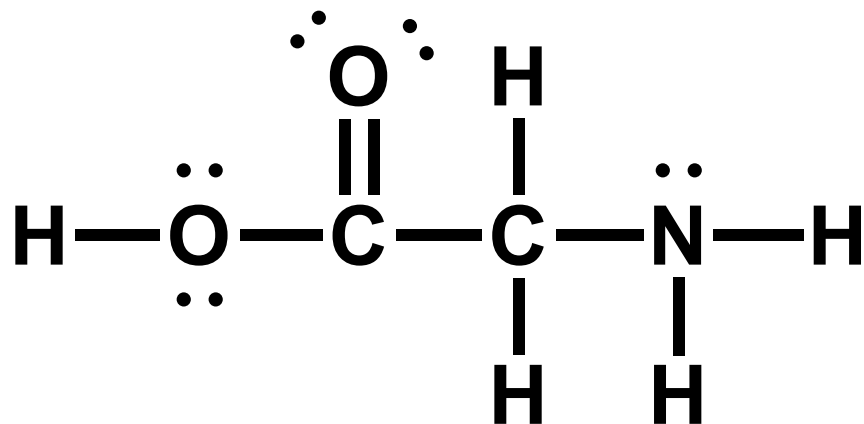
Practice Question 8: Determining Lewis Structures

> Lewis structures to determine the bonding in complex molecules

1. Determine total number of valence electrons
2. Any charges? YES – add (-ve charge)/subtract (+ve charge)
3. Build skeleton structure (incomplete Lewis Structure)
   a) Group 14,15,16 atoms usually "central"
   b) Hydrogen and Group 17 atoms "terminal"
   c) Make *multiple bonds* only when necessary
4. Check - Noble gas electronic configuration at each atom?

CH$_3$F

CH$_2$CH$_2$