

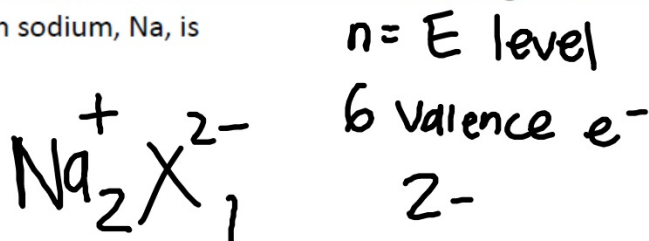
## Day 2.5 Warm-Up

1. Which of the following best represents the ground state electron configuration of the positive ion of an alkaline earth metal? **group #2 +2 = lost 2 e<sup>-</sup>**

- a.  $1s^2 2s^2 2p^6 3s^1$   
 b.  $1s^2 2s^2 2p^6 3s^2 3p^6$   **$1s^2 2s^2 2p^6$  [3s<sup>2</sup>] neutral atom**  
 c.  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2 3d^{10} 4p^5$   
 d.  $1s^2 2s^2 2p^6 3s^2 3p^6 4s^2$  **neutral atom**  **$1s^2 2s^2 2p^6$  ion**  
 $ns^2 np^4$

2. Atoms of an element, X, have the valence electron configuration shown above. The compound most likely formed with sodium, Na, is

- a. NaX  
 b. Na<sub>2</sub>X  
 c. Na<sub>3</sub>X  
 d. Na<sub>3</sub>X<sub>2</sub>

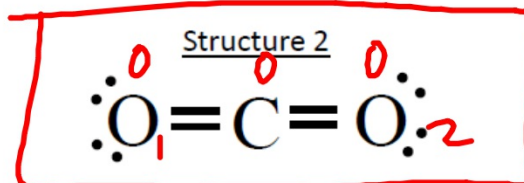
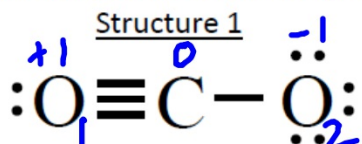


3. Which of the following is the most polar bond?

- a. N-F  
 b. C-F  
 c. O-F

**greatest difference in electronegativity**

4. Which Lewis structure below is the best representation of a molecule of CO<sub>2</sub>? Justify your answer with a calculation of formal charges.



**All formal charges = zero**

$$O_1 = 6 \text{ valence} - 2 \text{ lone } e^- - \frac{1}{2}(6 \text{ bonding } e^-) = +1$$

$$C = 4 \text{ valence} - 0 \text{ lone } e^- - \frac{1}{2}(8 \text{ bonding } e^-) = 0$$

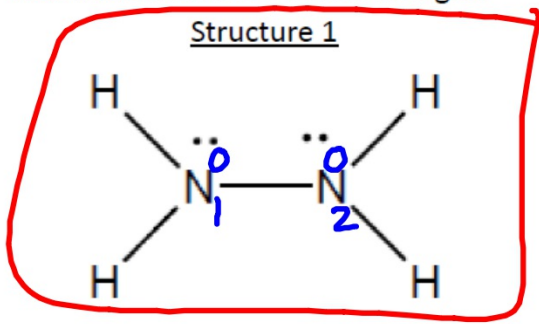
$$O_2 = 6 \text{ valence} - 6 \text{ lone } e^- - \frac{1}{2}(2 \text{ bonding } e^-) = -1$$

$$O_1 = 6 \text{ valence} - 4 \text{ lone } e^- - \frac{1}{2}(4 \text{ bonding } e^-) = 0$$

$$C = 4 \text{ valence} - 0 \text{ lone } e^- - \frac{1}{2}(8 \text{ bonding } e^-) = 0$$

$$O_2 = 6 \text{ valence} - 4 \text{ lone } e^- - \frac{1}{2}(4 \text{ bonding } e^-) = 0$$

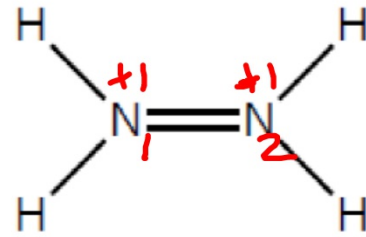
5. Which Lewis structure below is the best representation of a molecule of  $N_2H_4$ ? Justify your answer with a calculation of formal charges.



$$N_1 = 5 \text{ valence} - 2 \text{ lone } e^- - 3 \text{ bonding} = 0$$

$$N_2 = 5 \text{ valence} - 2 \text{ lone } e^- - 3 \text{ bonding} = 0$$

Structure 2

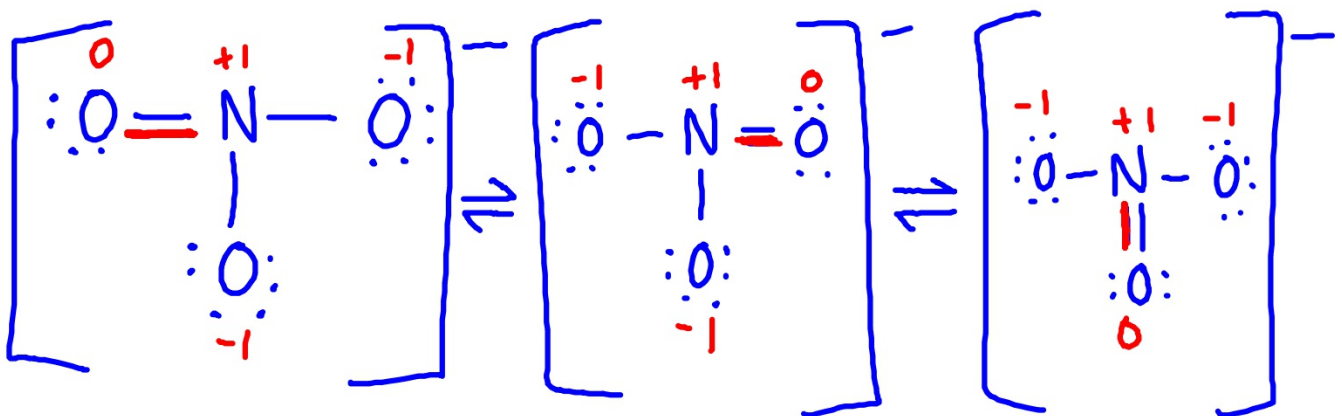


$$N_1 = 5 \text{ valence} - 0 - 4 = +1$$

$$N_2 = 5 \text{ valence} - 0 - 4 = +1$$

6. Draw the Lewis structure for nitrate,  $NO_3^-$ .

$$5 + 6(3) + 1 = 24 e^- - 6 = 18 e^- - 18 = 0 e^-$$



Resonance - multiple equal Lewis Structures  
delocalization of  $e^-$  in the double bond